JUN 7 1934

METAL INDUSTRY

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BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

Volume 32, Number 6 JUNE, 1934 Two Dollars Per Year

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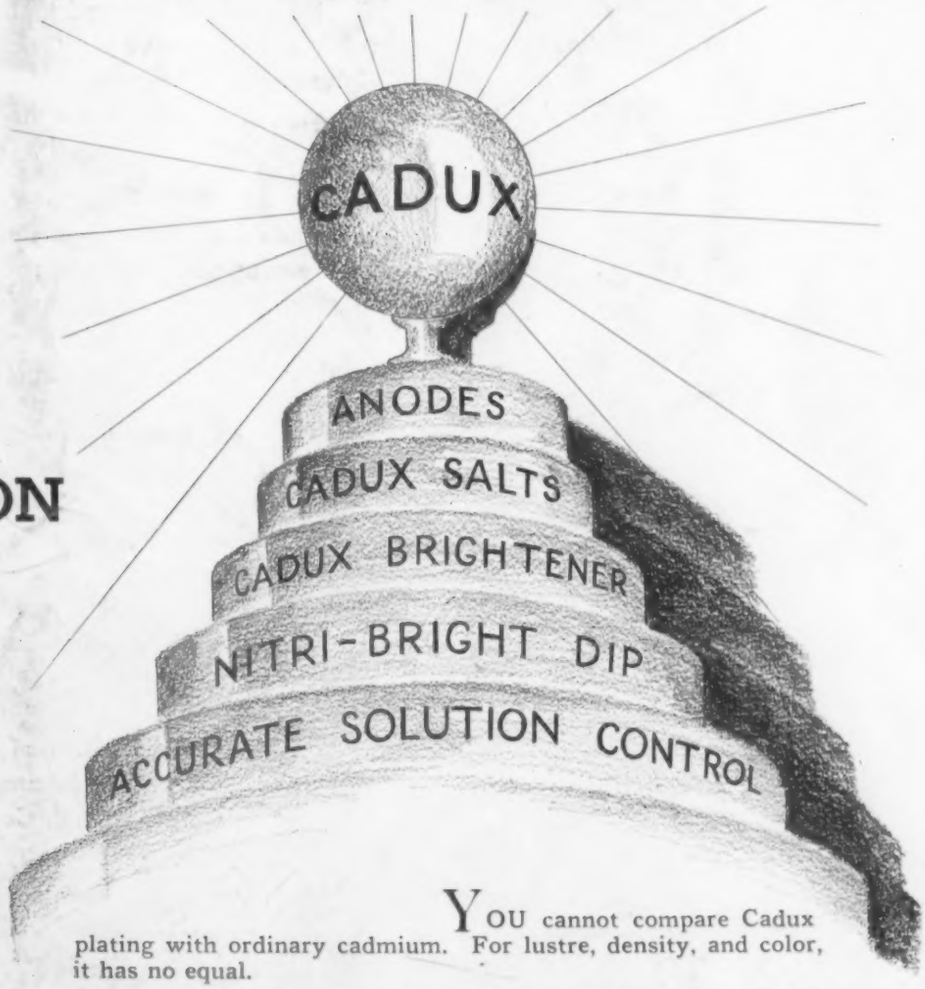

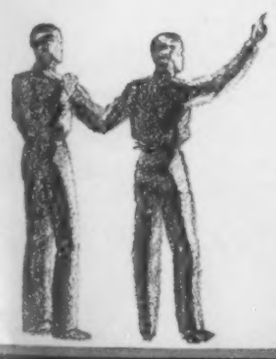

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Lacquers, which had their origin among the artificers of the Orient of antiquity, achieved their renaissance coincidentally with the birth of the present Zapon Company. This was in 1886.

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ALUMINUM WORLD — COPPER AND BRASS

BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

Vol. 32 NEW YORK, JUNE, 1934 No. 6

Conventions of the Platers in Detroit

Arrangements Complete for the Twenty-Second Annual Convention of the American Electro-Platers' Society, June 11-14, 1934. Educational Sessions and Entertainment Features. International Fellowship Club Meeting. Master Electro-Platers' Institute Meets June 9-10

EVERY one who attends the 20th annual convention of the American Platers Society in Detroit from June 11 to June 14, will be cordially welcomed into an industrial center that has successfully come through and arisen from a period of depression that has tried the faith of men in every line of business.

With financial structures crumbling and fortunes melting away almost over night, the City of the Straits, although staggering at times, has regained its equilibrium again and is forging ahead industrially in a way that may eclipse any of its achievements of other years.

To the credit of its industrial leaders, not many of the manufacturing plants were forced into liquidation. Although strained and handicapped for weeks through the closing of banks, the manufacturers maintained their grip and now, as platers from all over the United States and Canada, gather in a great conclave, they are well along the road to normal conditions, so far as production is concerned. Detroit is itself once more and everyone is glad.

The year 1934 is going to bring great numbers of visitors again into this great industrial center. For the benefit of those who are not familiar with this Great Lakes industrial area it might be well to explain that the building of Detroit on a spot where Nature has fashioned something splendid was partly due to circumstance, partly to necessity and partly to a well-localized convenience.

With the establishment of the motor car industry came the plating plants which have pioneered down through the years. With every step forward in the production of motor cars came another advancement in plating until now these plants are important units

THE DETROIT SKY LINE

in the general scheme of producing the motor car.

Motor manufacturers have seldom been able to handle all their plating production. This means that much work is turned over to jobbing plants, not only in Detroit but in other cities and communities all through the Great Lakes industrial area. Added to this is the plating work required by manufacturers of accessories extending down into Ohio, over into Indiana, and even as far away as Western New York.

Plating Plants in Detroit

Among the important plating plants and plating departments of manufacturing concerns are:

Acme Metal Etching Company
Aluminum Company of America
American Plating Co.
Apex Plating Co.
Art Metal Plating Co.
Auto City Metal Spinning & Mfg. Co.
Auto City Plating Co.
Beasley-Eastman Laboratories
Bellevue Plating Works
Bowen Products Corporation
Bromley Electro Plate Co.
Brown-McLaren Mfg. Co.
Buechner Plating Works
Burroughs Adding Machine Co.
C-F Plating Co.
Cadillac Motor Car Co.
Caille Motor Co.
Capitol Brass Works
Casket Hardware Mfg. Co.
Chevrolet Motor Co.
Chrysler Corporation
City Pattern Works
Commonwealth Brass Corporation
Commonwealth Industries
Consolidated Brass Co.
Continental Die Casting Corporation
Continental Motors Corporation
Crescent Brass & Pin Co.
Detroit Brass & Malleable Works
Detroit Hardware Mfg. Co.
Detroit Lubricator Co.
Detroit Mausoleum Equipment Works
Detroit Metal Polishing & Plating Co.
Detroit-Michigan Stove Co.
Detroit Plating Industries
Detroit Torch & Mfg. Co.
Devereaux Co.
Dodge Bros.
Douglas & Lomanson Co.
Eaton Detroit Metal Co.
Echo Plating Works
Electro-Chemical Pattern & Mfg. Co.
Electro Depositing & Finishing Co.
Electro-Master, Inc.
Essex Brass Corporation
Eureka Plating & Polishing Co.
Eureka Vacuum Cleaner Co.
Evaco Process Co.
Ferro Stamping & Mfg. Co.
Ford Motor Co.
Gardner & Scanlan
General Spring & Bumper Corporation
Graham-Paige Motors Corporation
Grand River Plating & Mfg. Co.
Hackett Brass Foundry
C. M. Hall Lamp Co.
Herron-Zimmers Molding Co.
Hoskins Mfg. Co.
Industrial Plating Works
J. Wallace Ivers Co.
F. L. Jacobs Co.
Kelsey-Hayes Wheel Corporation
Kelvinator Corporation
Lincoln Mfg. Co.
Lincoln Motor Co.
Long Mfg. Co.
Lukomski Bros.
Lyon, Inc.
Richard C. Mahoney & Sons
McCord Radiator & Mfg. Co.
Mechanical Plating Co.
Metal Finishers' Co.
Metro Metal Mfg. Co.
Michigan Chrome Co.
Monarch Mfg. Co.
Motor Products Corporation
Nicholl-Hale Chrome Service, Inc.
Oleksik Bros.
Packard Motor Car Co.
Parker-Wolverine Co.
Penberthy Injector Co.
Peninsular Metal Products Corporation
Premier Mfg. Co.
Robert L. Reed
Rex Plating Works
Roberts Brass Mfg. Co.
Joseph C. Robinson Co.
Scott Valve Mfg. Co.
Service Plating Co.
Sherwood Brass Works
Stearns Register Co.
Ternstedt Mfg. Co.
Thompson Products, Inc.
Udylite Process Co.
Uni-Flo Grille Corporation
United Platers, Inc.
Universal Button Fastening & Button Co.
Wayne Mfg. Co.
Wolverine Plating Co.
Yale & Towne Mfg. Co.

Entertainment Features

It should be remembered much entertainment is in store for those who attend the convention—both men and women. Reference to the program will show that one whole afternoon is to be spent at Greenfield Village, Henry Ford's nationally-known exhibit of early Americana. It is in the Dearborn area and there Mr. Ford has grouped interesting relics dating back to Colonial days.

Greenfield village is the only exhibit of its kind in the world and its setting is enhanced by its association with Detroit where the latest developments of the

Scene in Greenfield Village

machine age are placed side by side with the old familiar scenes of early America.

In the automotive display are shown the largest and only bicycle of its kind in the world, big-wheeled bicycles, gigs, cutters, surreys, family coaches, and the battered buggy that used to get a coat of paint when visitors came to the country. Every form of transportation from the earliest to the latest achievements in scientific engineering are on display.

In the colonial home are spinning wheels, looms, instruments for rug making, quilting frames, costumes of all ages and for all occasions, cabinets, Exeter pottery and Sandwich glass, toys and replicas of early Saxon houses. In the Menlo Park group of buildings is the house where Edison perfected the first incandescent light. Here also stands the machine shop where he labored through the long hours of the night, the carbon house, the carpenter's shop, and even the South London boarding house, the first house in the

J. H. HANSJOSTEN
President,
Detroit Branch,
A. E. S.

world lighted by electricity, the original Edison equipment and tools used in the experiment and the photometer room where Edison measured the candle power of his first successful lamp.

Charles H. Eldridge is Chairman of the Program Committee. **Edward Klatzke** is in charge of Registrations; **T. C. Eichstaedt,** Publicity; **C. L. Southwick,** Transportation; **J. H. Hansjosten** and **A. G. Spence,** president and vice-president, respectively, of the Detroit Branch, are ex-officio members of all committees.

The following members of the Detroit Branch of the A. E. S. served on the Entertainment Committee, and are responsible for the pleasures in store for all who attend the convention:

MEN

H. M. Cherry, Chairman
C. R. Beaubien
G. L. Nankervis
C. L. Southwick
A. B. Wilson

WOMEN

Mrs. J. H. Hansjosten, Chairman
Mrs. C. R. Beaubien
Mrs. H. M. Cherry
Mrs. T. C. Eichstaedt
Mrs. C. H. Eldridge
Mrs. T. W. Kirby
Mrs. G. H. Kutzen
Mrs. B. F. Lewis
Mrs. W. W. McCord
Mrs. G. L. Nankervis
Mrs. W. H. Phillips
Mrs. A. G. Spencer
Mrs. C. L. Southwick
Mrs. A. B. Wilson

The members of the Finance Committee are:

William McCord
A. G. Spencer
H. M. Cherry
A. B. Wilson
Chas. Beaubien
T. W. Kirby
G. L. Nankervis
Geo. Kutzen
Percy L. Stapleton
J. H. Hansjosten

ENTERTAINMENT PROGRAM

Women's Program

Monday, 1 p. m.—Detroit Zoological Garden
Tuesday, 11.15 a. m.—Luncheon Dearborn Inn
Tuesday, Afternoon—Greenfield Village
Wednesday, Noon—Luncheon, Detroit Yacht Club
Wednesday, 8. p. m.—Theatre Party at Michigan Theatre
Thursday, 7 p. m.—Banquet

Men's Program

Monday, 8 p. m.—Open House, Fellowship Club
Tuesday, 1 p. m.—Greenfield Village
Wednesday, 1 p. m.—Ford Plant
Thursday 8:30 a. m.—General Plant Visitation
Thursday, 7 p. m.—Banquet

C. A. VAN DERAU
President, American Electro-Platers' Society

H. A. GILBERTSON
Secretary-Treasurer, A. E. S.

W. J. R. KENNEDY
Editor, The Monthly Review of the A. E. S.

Educational Program

Monday—June 11, 1 p. m. E. Steen Thompson, Chairman

1. "Summary of Researches on Plating at the Bureau of Standards"—Dr. W. Blum, Bureau of Standards, Washington, D. C.
2. "Complete Report of Exposure Tests on Plated Steel with Recommendations"—P.W.C. Strausser (Research Associate for the A.E.S.) and Dr. W. Blum.
3. "Plans for Investigating the Plating of Non-Ferrous Metals"—Dr. W. Blum.
4. "Testing of Plated Metals for Compliance with Federal Specifications"—M. R. Thompson, Bureau of Standards.
5. "Formal Discussion of Mr. Thompson's Paper"—by Wm. M. Phillips, General Motors Corp., Detroit, Chairman, Joint Committee on Specifications for Plating.

Tuesday—June 12, 9 a. m. T. F. Slattery, Chairman

1. "Nickel Plating"—Ray Goodsell (Milwaukee Branch, A. E. S.), Racine Plating Works, Racine, Wis.
2. "Bright Nickel Plating"—L. E. Eckelmann, Pyrene Manufacturing Company, Newark, N. J.
3. "Relation of Coating Thicknesses to Service Life on Zinc Die Castings"—E. A. Anderson, New Jersey Zinc Company, Palmerton, Pa.
4. "Ductility and Adhesion of Nickel Deposits"—F. P. Romanoff, Apollo Metal Works, La-Salle, Ill. (Electrochemical Society Meeting, Asheville, N. C., Apr. 26, 1934).

Tuesday—June 12, 8 p. m. Dr. William Blum, Chairman

1. "Detergent Properties of Alkalies, Part I, Plating Room Cleaners"—N. Promisel, Research Electrochemist, International Silver Co., Meriden, Conn.

2. "Pictorial Study of Plating Conditions"—Wm. M. Phillips, Research Engineer, General Motors Corp., Detroit, Mich.
3. "Does Chemical Control of Plating Solutions Solve the Electroplaters' Problems?"—Geo. B. Hogaboom (Newark Branch, A.E.S.), Research Engineer, Hanson-Van Winkle-Munning Co., Matawan, N. J.

Wednesday—June 13, 9 a. m. Walter S. Barrows, Chairman

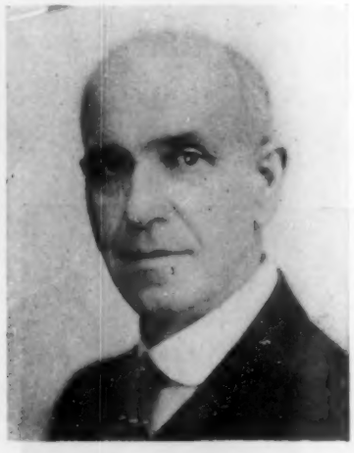
1. "Recent Progress in Industrial Cleaning"—R. W. Mitchell, Magnus Chemical Company, Garwood, N. J.
2. "Plating Plant Layout"—A. J. Lupien (Detroit Branch A. E. S.), Udylite Process Company, Detroit, Mich.
3. "Copper Cyanide Plating, Its Peculiarities"—Elmer Woodmansee (Detroit Branch A.E.S.).
4. "Concentrated Cyanide Plating Baths"—Dr. L. C. Pan, U. S. Research Corp., Long Island City, N. Y.

Thursday—June 14, 1 p. m. William M. Phillips, Chairman

1. "Rust Proofing before Color Finishing"—R. R. Tanner, Metal Finishing Research Corp., Detroit, Mich.
2. "Rubber in the Plating Industry"—R. H. Kittner, American Hard Rubber Co., Akron, Ohio.
3. "Some New Developments in Buffing Compositions"—Geo. M. Cunningham, National Oil Products Co., Harrison, N. J.
4. "Chromium Plating on Sheet Zinc"—Chas. H. Proctor (New York Branch A.E.S.), Founder of the Society.

GEORGE B. HOGABOOM
Will Speak on Chemical Control

DR. WILLIAM BLUM
Chairman of an Educational Session



W. S. BARROWS
Chairman of an Educational Session

Meeting of the Master Electro-Platers' Institute of the United States

THE first annual meeting of the Master Electro-Platers' Institute of the United States will also be held in Detroit at the Statler Hotel. The dates set are June 9th and 10th, so that those who attend can conveniently stay over for the meetings of the American Electro-Platers' Society.

The Master Electro-Platers' Institute was organized in July 1933, with the object of formulating a Code under which the job plating trade throughout the country could work as an industry. The first officers were: **James Gerity, Jr.,** Toledo, Ohio, president; **E. J. Musick,** St. Louis, Mo., first vice-president; **H. E. Coombes,** Pasadena, Calif., second vice-president; **James E. Nagle,** Toledo, Ohio, secretary-treasurer; **Philip Sievering,** New York, counsellor.

The purposes and objectives of the Institute are:

(1) Cooperation with the Administration and with industry in general in recovery and re-employment movements;

(2) Recognition of job electro-plating as a district industry;

(3) Self-regulation of the industry through a Code of Fair Practices;

(4) Local autonomy by districts and trade areas in the solution of local problems and the enforcement of code provisions;

(5) Research in and publication of the administrative problems of costs, estimation, contracts, employee and customer relationships and other considerations of management;

(6) Elevation of the electro-plating industry to a position of esteem in the minds of fabricators and manufacturers of metal products as an indispensable aid in the process of rendering products decorative, saleable, corrosion resistant, in renovating metal products and in adding utility to the tools and equipment of manufacturers.

JAMES GERITY, JR.
President, Master Electro-Platers' Institute

LEO JENSEN
Vice-President, Master Electro-Platers' Institute

EDWARD MUSICK
Vice-President, Master Electro-Platers' Institute

After months of unremitting labor by the officers in interesting individual platers throughout the country, another meeting was held in Cleveland in December 1933, at which the Institute was definitely set up with a working organization. At that meeting (reported in the **Metal Industry** for January 1934) it was decided definitely to formulate a Supplementary Code under the Fabricated Metal Products Code, hearing was held on Friday, May 18th in Washington). This code includes detailed points necessary for proper functioning of the electroplating industry. For example, it prescribes a uniform system of cost accounting and a standard method of cost estimating, to be set up by the Code Authority as soon as appointed. It is expected that these measures will eliminate the wide differences in estimates on plating

R. J. NAGLE
Secretary-Treasurer, Master Electro-Platers' Institute

PHILIP SIEVERING
Counsellor, Master Electro-Platers' Institute

in order to have practical working rules suitable in detail for the electroplating industry.

The original officers were retained in order that their experience would be available for the vast amount of work necessary.

Another meeting was held during the following month, also in Cleveland, to complete the organization. Committees were appointed to work on the following problems.

1. Costs, accounting, estimating and contracts.
2. Organization.
3. Fair practices.
4. Wage hour and labor policies.

This meeting was reported in the **Metal Industry** for February 1934.

That the officers of the Institute have been diligent is proved by the speed with which they have done their work. The Supplementary Code has been formulated and submitted to the Administration. (A public contracts which are so prevalent at the present time. The country has been divided into districts, each of which will be covered by a District Code Committee, which will be responsible to the National Code Authority.

It is hoped that the Code will be approved at an early date, after which the electroplating industry can function under proper government and fair regulation of trade practices.

The present officers of the Institute include some who were not elected at the original meeting. A complete list follows:

James Gerity, Jr., Toledo, Ohio, president.
Edward Musick, St. Louis, Mo., vice-president.
H. E. Coombes, Pasadena, Calif., vice-president.
Leo Jensen, Chicago, Ill., vice-president.
Louis Wisch, Brooklyn, N. Y., vice-president.
R. J. Nagle, Toledo, Ohio, secretary-treasurer.
Philip Sievering, New York, counsellor.
Hugh Booth, 8735 E. Jefferson Avenue, Detroit, Mich., executive secretary.

Program of Meetings and Entertainment

SATURDAY, JUNE 9th
9:00 A. M.—12 Noon
Registration—Introduction of Delegates—Accrediting Official Delegates Reports, suggestions and petitions from Branch Associations.
12:00 A. M.—1:00 P. M.
Luncheon—Special service to Registered guests.
1:30 P. M.—5:00 P. M.
Business session including report of Cost Committee, report of Code Committee, Treasurer's report and report of Executive Secretary—Consideration of suggestions and petitions—Other business matters.
5:00 P. M.—8:00 P. M.
Recess
8:00 P. M.—9:30 P. M.
Harry Newton Clarke (Councilor in Human Relations in Industry, Cleveland, Ohio) will speak on "Present Day Opportunities for Trade Associations."
9:30 P. M.—11:00 P. M.
Entertainment, Cabaret Style—Refreshments. Entertainment furnished through the courtesy of the Plating, Rust Proofing and Enameling Association of Michigan.

SUNDAY, JUNE 10th
9:00 A. M.
Main Dining Room—Breakfast—Special Service to Registered Visitors.
10:00 A. M.—1:00 P. M.
Election of Officers—Final Business Session.

SUNDAY AFTERNOON
Recreation Suggestions; American League Baseball Game—Navin Field, Detroit vs. Chicago—3:00 P. M.; Tour of Greenfield Village, Detroit Zoological Gardens, Belle Isle or Golf; cars leave hotel 2:15 P. M.

6:30 P. M.
BANQUET—Main Banquet Hall; Speeches by retiring officers and installation of new officers. Chevrolet Double Male Quartette. Invited speaker, **H. S. Kimball,** Chairman of Code Authority for Basic Industry and Secretary of the Fabricated Metal Products Federation, Subject: "The Future of Code Administration in Industry."

International Fellowship Club

THE International Fellowship Club, an organization of salesmen catering to the electro-plating industry, will follow its regular custom of meeting at the same place and approximately the same time as the American Electroplaters' Society. Its regular meeting will be held sometime during the convention period, June 11-14th. Information as to the exact date will be obtainable upon registration, from the Convention Committee, or from Thomas A. Trumbour, secretary-treasurer of the Fellowship Club, who will be at the Statler Hotel.

A feature of the Convention will be the Open House Program, held by the Fellowship Club, which was one of the interesting events of the Rochester and Philadelphia conventions. This Open House will be held on Monday, June 11th at 8:30 P.M., at the Everglades Club, Tuller Hotel. All members and guests at the convention are cordially invited.

W. L. CASSELL
President, International Fellowship Club

THOMAS B. HADDOW
Vice-President, International Fellowship Club

T. A. TRUMBOUR
Secretary-Treasurer, International Fellowship Club

Special Fare Arrangements

Special fares to Detroit are obtainable on the railroads from various points. Either of the following arrangements can be made:

1. Individual round-trip tickets good for 30 days at one and one half (1½) times the one-way rate. To obtain this rate, the trip must be started on a Tuesday or a Saturday.
2. Buy a one-way ticket on any day **but be sure to get a Convention Certificate from the ticket agent.** This certificate must be validated at the Convention. If 100 people obtain these Certificates, the return trip can be obtained for one-third (1/3) the regular rate. When asking for the Convention Certificate be sure to mention the name of the American Electroplaters' Society or the Master Electroplaters' Institute. These tickets go on sale June 7th up to and including June 11th.

Hearing on Platers' Code

A PUBLIC hearing of the Supplementary Code of Fair Competition for the Electroplating and Metal Polishing and Finishing Industry was held in Washington, D. C., Friday May 18th. The code was presented by the Master Electro-Platers' Institute of the United States, which was represented by the Code Committee consisting of the following:

James Gerity, Jr., R. J. Nagle, Edward Musick, Leo Jensen, Philip Sievering, Jr., Cranston Spray, Hugh Booth.

W. S. Giehle, Deputy Administrator, was in charge of the hearing. Among those present were Mr. Bolen of the Legal Department of the N.R.A., Mr. Flynn, Labor Representative, Mr. Keeney, Consumers' Representative. The public hearing had been preceded by two private sessions in which the Code Committee had been advised informally by the Administration as to the details which were necessary to make their Code acceptable.

The Code Committee was asked numerous questions by the Administration in order to determine whether or not the Institute was truly representative of the plating industry of the country. This having been passed satisfactorily, the work proceeded to the specific clauses of the code. Necessarily, some changes were made in the originally proposed code, but these changes were comparatively few, and of minor importance. Some of the most important features of this code were at least tentatively allowed. For example the clause which specified a uniform cost system for the whole industry and a uniform method of estimating was allowed; also open prices were permitted.

The method arranged for administering the Code was particularly suitable for the plating industry which is almost entirely local in character. The work will be done by and powers will be delegated to District Code Committees which will have all the powers of the Code Authority to decide questions within their districts. The National Code Authority will assume jurisdiction only when there are differences between districts.

The clause relating to a uniform estimate form for all of the industry to use in submitting quotations, was stricken out for several reasons. Many platers are forced to give quotations in large numbers, up to 20 or 25 a day, many of them over the telephone. Another difficulty is that many large corporations have always insisted upon their own forms and specifications in placing orders for plated work. The attempt to super-impose a general estimate form for the whole industry would result in too much confusion to make it possible at this time.

It must be remembered, of course, that the proposed Code still has to be looked over and approved by several departments of the Administration before it can be submitted to the President. However, from the reports of those who were present at the hearing, it seems very likely that the Code will go through the necessary channels and be approved substantially as it stands in a comparatively short time.

Gases and Metal Surfaces

PROFESSOR E. K. Rideal, of Cambridge University, delivered the twenty-fourth Annual May Lecture of the Institute of Metals in London on Wednesday, May 9, 1934, on "Gases and Metal Surfaces".

Professor Rideal said that the reactions of gases with metals are important not only in metallurgy but also in a number of important chemical reactions, especially those termed catalytic such as are involved in the production of synthetic ammonia or fuel oil. From a study of the absorption of gases by metals we can obtain some idea of the structure of the surface of the metal and we find that metals do in fact contain numerous fissures and holes which affect the physical properties of the metal.

Gases can be held on to metal surfaces by at least two distinct methods, one by a purely physical attractive force and the other where a species of chemical combination takes place between gas and metal. Each of these combinations possesses characteristic properties which can be examined and the conditions of the conversion of one form with the other can be explored. Absorbed gases can move over the surface of metals by process of activated migration, analogous to hopping and this hopping is found to play an important part in rates of reaction at surfaces. Metallic vapors when condensed as sponges possess remarkable properties which eventually disappear as the sponge collapses.

Aluminum Polishing

Details of the Operations and Materials Used

ALUMINUM articles are usually made by one of three different methods:

(a) Cast in sand.
(b) Die cast in moulds.
(c) Formed from sheets in power presses.

Practically all aluminum articles are polished. The metal is soft and ductile and is easily cut but in many instances sand or small pit holes must be removed. This is done by polishing with an abrasive.

The size of abrasive and the type of polishing wheel to be used depends upon the method used in manufacturing the part to be polished and the size, shape and condition of the part previous to polishing. The amount of material to be removed also affects the abrasive size.

Each type of article presents a different problem and the ultimate finish desired must receive consideration according to the particular article. Sand cast pieces have a rough outer surface similar to a moulded casting. Die castings present a fairly smooth surface and on sheets it is only necessary to remove the press marks.

It is a loss of time to use abrasive either too fine or too coarse for roughing, when a high finish is desired. Time gained in roughing, using coarse abrasives, will be lost on the following operations in removing the coarse roughing marks; too fine grain sizes reduce the rate of production and at the same time do not give a materially better final finish.

On heavy castings, where considerable metal is removed, the first roughing operation can be successfully done with No. 60 Alundum abrasive set up on a sewed buff, felt or canvass wheel. The sewed buff is the more resilient and follows the shape of the work best, and should be used for round or formed work.

Sand cast pieces, with small pit holes and rough exteriors are most successfully roughed with a greased wheel of not coarser than No. 60 Alundum grain.

After roughing with No. 60 the next operation can be made with No. 90 or 100 depending upon the finish desired. There are some instances where an additional operation is necessary. In such cases wheels set up with No. 180 or No. 200 are used.

On die cast pieces which are fairly smooth from No. 90 to 150 or 180 Alundum abrasive can be used.

The polishing of sheets is readily done on a felt wheel set up with No. 180 Alundum and buffed with a felt wheel which gives a much better finish than a cotton buff. On sheets and flat work it is advisable to change the direction of the strokes when changing from one size to the next finer. This will facilitate the obliteration of the scratches left by the coarser grain. Many sheets on which only the press marks must be removed can be polished directly with a buffing wheel using Tripoli for the polishing agent. No coarser abrasive is necessary in this instance.

On work that is painted instead of buffed, the uniformity of the grain is most important. This is especially true of work finished in lacquers of a light finish. Oversize grain will not break down but will leave its mark on the surface which is very easily distinguishable.

Successful finish or polish depends chiefly upon two points. First, the care that is used in preparing the article for the final buffing and second, a plentiful supply of grease, tallow or some other lubricating agent used on the polishing wheels.

All roughing scratches must be removed in the fining operation. Work not properly finished on the fining wheel comes from the buff wheel with a high color but rough appearance. This is caused by the buff wheel dragging in the scratches and making them deeper.

The use of plenty of grease on all of the operations in the polishing of aluminum will mean a much better eventual finish. If a wheel becomes too dry it matters little what size abrasive is used for it will imprint marks as deep as the amount of metal load on its face. Grease sticks sold by platers' supply houses, beef tallow, suet, kerosene, or an oil rag applied to the wheel reduces loading and dragging of the work and at the same time improves the quality of the finish for the final or buffing operation. If plenty of lubricant or grease is not used the buffing operation is harder on the buffing wheel and there is a possibility of the buff dragging the pits and holes, making a poor finished casting.

In obtaining the final finish Tripoli is sometimes applied on the buff wheel to help cut the metal and obtain what is termed the "Bottom." After the Tripoli, a silica compound may be used to remove buffing marks and give color. Where a high color is desired, lime and rouge are sometimes employed.

Grits & Grinds.

Polished Metal Surface Is Molten

In a report from Science Service an interesting theory is put forth by Professor G. I. Finch, Dr. A. G. Quarrell and J. S. Roebuck of the Imperial College of Science, London, England. In working with a special type of instrument called the electron diffraction camera on a piece of polished copper which was being bombarded with particles of zinc emitted from a zinc wire rapidly heated in a vacuum of electric current, they found that the film of zinc gradually disappeared. This disappearance was repeated with further applications of zinc and only until the twelfth application did the zinc remain on the surface.

The explanation according to Professor Finch, is that the incoming crystals of zinc were being dissolved in the polished copper. Like snowflakes falling on water, the crystals rest for a moment on the surface and then disappear. This is evidence that the surface of the polished metal is really a liquid.

Press Casting Brass and Other Copper Base Alloys

By CHARLES PACK
Pack-Morin, Inc., New York

An Outline of the Progress that Has Been Made in this New Art by Brass Mills, Die Casting Manufacturers and Users of Castings.—Part 2, Conclusion*

Position of Brass Press Casting in Industry

From the foregoing, it must be quite evident that the brass press casting process must be recognized by engineers as a commercial process of manufacture. There can be no doubt but that brass press castings will continue to find increasingly large fields of application in the metal arts. However, it is not to be assumed that the brass press casting will entirely replace brass forgings, brass sand castings, zinc base die castings or brass screw machine products and it would be desirable at this time to point out the economic position that the brass press casting occupies in the metal working art and more particularly, the competitive relation of this product to similar metal parts produced by other methods of manufacture.

Brass Press Castings vs. Zinc Base Die Castings

Brass Press Castings cannot, at this time, compete with zinc base die castings due to fundamental factors of cost that, in the writer's opinion, cannot possibly be overcome in the future. Where zinc base die-castings can be used and where such die-castings function satisfactorily, the use of brass press castings would be folly, since the cost of the latter must be substantially higher. The basic factors of cost underlying this situation are the following:

a. The zinc base alloys used in die casting practice contain a minimum of 93% zinc and a maximum of 3% copper. The lowest priced brass contains a minimum of about 60% copper and a maximum of about 40% zinc. Since the market price of copper is substantially higher than that of zinc and since it is unlikely that this price relation will be changed in the future, it is evident that the brass press casting must carry the burden of a higher metal cost than the zinc die casting.

b. The alloying costs of any copper base alloy must be considerably higher than that of a zinc base die casting alloy since the former involves higher temperatures and the use of refractory lined furnaces, whereas the zinc base alloy is made up in iron pots at comparatively low temperatures.

c. Melting losses are considerably higher when casting brass due to volatilization of zinc which occurs to some extent even with the lower casting temperatures used in the press casting process.

d. The life of a die used for zinc alloys is practically indefinite. The useful life of a die used in the brass press casting process may be anywhere from 10,000 to 50,000 shots. This involves an additional die replacement cost which must be pro-rated over the cost of the castings produced from the dies.

Extensive efforts are being made to increase the life of dies used for brass press casting and it may safely be assumed that, as in the case of aluminum die castings, considerable progress will be made. However, it is also reasonable to assume that the maintenance and upkeep costs of a die used for casting brass at 1600°F, will always be greater than on a die that is used for casting zinc at a temperature of 800°F.

e. It is a well established principle in die casting practice that the degree of accuracy to which a die-casting can be held will vary in inverse ratio to the melting point of the alloy being cast. Tin and lead alloys die castings can be held to closer tolerances than the zinc base alloys and the zinc base alloys can be held to closer tolerances than the aluminum alloys, etc. This may necessitate some machining operations on brass castings that could be dispensed with on zinc die-castings.

f. It is also well established in die casting practice that many small holes and slots can be cast in low melting point alloys that cannot be cast in the higher melting point alloys, due to the greater shrinkage and heat effect on the delicate members of the die.

Brass Press Castings vs. Brass Sand Castings

"Die castings cannot compete with simple sand castings, requiring little or no machining." This is a phrase commonly used in the die casting industry and this rule generally applies to brass press castings. Nevertheless, there are many instances where the press casting process will show substantial savings in cost over sand foundry practice even though no savings are made in machine operations. The casting shown in Fig. 3 will serve as a good illustration.

This casting was formerly produced in a modern sand foundry, in a simple two part mold, green sand throughout and six impressions on a match plate. This part is now made by the press casting method and the threads shown in the illustration are machined. All of the machine operations performed on the sand casting must also be performed on the press casting, but the latter method shows a substantial saving in cost, for the following reasons.

*Part 1 was published in our May issue.

a. Using the thinnest walls that are practical for sand foundry practice, a reduction of 30% in weight was made when redesigned for the pressure casting process See Fig. 3A.

b. Shrinkage difficulties necessitated the use of an 80% copper alloy with a small percentage of tin in foundry practice, whereas a 60% copper alloy, with no tin content is used in the press casting process.

c. The sand casting required a cleaning operation preparatory to machining. The most economical method was found to be sand blasting. With the most modern sand blasting equipment the direct labor charge for this operation was 1½c. per casting with a 500% overhead charge, making a total cost of 9c. per casting. With the press casting method this was eliminated since the castings are ready for machining as they are removed from the casting machine.

d. These castings must be leak proof and with the very best foundry practice, it was found necessary to give the castings a 100% leak test, which resulted in an appreciable percentage of rejects. The pressure castings were found to be uniformly sound and the elimination of the testing operation and the rejects, resulted in a substantial saving.

e. Although the same machine operations are required on the sand and the press castings and although every precaution was taken to remove the sand from the sand castings, the press castings showed savings in machining costs due to the reduced maintenance costs on the machine tools.

Brass Press Castings vs. Brass Forgings

Where accuracy and fine detail are of paramount importance, the press casting will surpass the forging. Where physical properties, coupled with free machining properties are the predominating issues, then the forging will be used in preference to the press casting. It is doubtful if press castings will ever replace forgings entirely, but there can be no doubt that an appreciable percentage of brass forgings can be replaced by brass press castings at a substantial saving in cost. The major savings are accounted for by the differential in raw material costs and the ability to cast parts with thin walls, holes, slots, etc.

In the hot forging process, the raw material used in wrought brass, in the form of rods, bars or extruded shapes. In the press casting process, ingot brass is used and secondary ingot made from turnings, clippings, etc. can be used with satisfactory results. This means that the basic metal cost used in a forging is at least double that which is used in a press casting of the same weight, at the present market price of ingot and wrought metals. Furthermore, the press casting process can re-use all of the scrap produced in the process such as gates, fins, turnings, rejects, etc. with an allowance of about 1c. per pound for re-melting costs. In the forging process, flashes, overflows, rejects, turnings, etc., must be converted into wrought shapes in order to be re-used in the process which, at the present market, would mean an expense of 7c. per pound. To illustrate this point more clearly, reference is made to a handle shown in the upper, left hand corner of Fig. 2.

To make this job in the forging process, a wrought metal blank is used weighing 1 lb., at a cost of 12½c. In the press casting process due to the ability to cast the main hole and the greater uniformity obtained, the casting weighs only .60 lbs. and the basic metal cost may be from 4c. for secondary metal to 6½c. for virgin metal. Assuming that all virgin metal is used and assuming the cost of ingot brass at 6½c. and wrought brass at 12½c. per pound, we arrive at the following metal costs for this handle.

Forging		Casting	
1 lb.	12.5c.	.6 lb. @ 6.5c.—	3.9c.
.4 lbs. scrap allowance @ 4c. per pound	1.6		
Net metal cost	10.9c.		

In this instance, although virgin metal is used, the metal cost is 3/9c. for the press casting and 10.9c. for the forging.

Brass Press Casting vs. Brass Screw Machine Parts

The die casting process does not compete with small, simple screw machine products, but the comparatively new brass press casting process has demonstrated that the press casting can be used, not to replace the screw machine product, but to reduce the cost of that product. The stem of a common kitchen faucet, Fig. 15, may be used as an illustration. These parts are usually

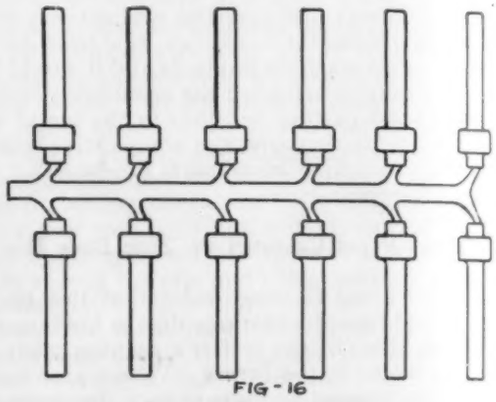


Fig. 15—Wrought Metal Blank for Producing a Valve Stem by the Screw Machine Method

Fig. 16—Die Layout for Producing Blanks by Press Casting a Valve Stem for Finishing by the Screw Machine Method

made on a screw machine from bar stock. The amount of metal removed by the screw machine varies with the size of the stem, but usually the finished stem weighs from 25% to 40% of the original bar used. Assuming the 40% weight, we find that the basic metal cost per pound of finished stems to be as follows:

1 lb. bar stock @ 12½c	12.5c each
Less allowance of .6 lb turnings @ 4c	2.4c each
Net cost	10.1c

For an ordinary size stem, a 12 impression die was constructed (Fig. 16) in order to produce the blanks by the press casting method. The speed of operation was 150 shots, or 1800 castings per hour. Only 10% of the stock was allowed for machining and the cost of these screw machine blanks was as follows:

Casting Labor, 60 per hr (1800 per hr)	.33 per M.
Casting Burden, 300%	1.00 per M.
Removing gates & trimming labor	3.00 per M.
Removing gates & trimming burden 100%	3.00 per M.
Metal @ 6.5c per lb. (.44 lbs.)	28.60 per M.
Dross Loss and Re-melting Gates—10%	2.86 per M.
Total Cost	$38.79 per M.

From the foregoing it is evident that substantial saving can be made in castings blanks used for screw machine jobs. The savings will vary directly with the percentage of metal removed by the screw machine. In the example cited, the metal cost for the screw machine process is more than double the cost of the combined screw machine and press casting process.

Alloys Used in the Brass Press Casting Process

The practical application of the brass press casting process is limited, at this time, to the so-called, yellow brasses, which include such alloys as Manganese Bronze, Tobin Bronze and Muntz Metal. Higher copper bronzes and Nickel-Silver can also be cast by this method, but the press casting of such alloys cannot be considered as commercial practice since the die life is very limited when alloys are used whose casting temperature exceeds 1600°F. The bulk of brass press castings are being produced from 60-40 brass, the casting range of this type of alloy being from 1525° to 1575°F. Sieg and some European producers recommend the addition of .5 to 1% tin, but the only advantage that the writer has found from this practice is an increase in hardness of the alloy. Slight additions of aluminum, however, have decided advantages in the casting process.

The physical properties of pressure cast 60-40 brass varies with the permissable lead content. Where lead is maintained below 0.1%, test bars showed 70,000 lbs. per sq. in. and 15% elongation. This alloy, however, is rather difficult to machine and when lead is added to improve machining properties, the physical properties decline sharply. With 2% lead, the tensile strength is approximately 55,000 lbs. per sq. in. and the elongation 6 to 8%.

The high silicon brasses are well adapted to the press casting process. These alloys contain approximately 4 to 5% silicon, 10 to 15% zinc and the balance, copper. Despite the high copper content, these alloys can be cast by the pressure method below a temperature of 1600°F. The German "Tombasil", the Doehler Company's "Brastil" and the American Brass Company's "Webert Alloy" come within this classification of alloys. The American Brass Company has consistently obtained a minimum tensile strength of 90,000 lbs. per sq. in. and a minimum elongation of 10% as determined on a standard A. S. T. M. die cast test bar with their patented "Webert Alloy."

The extension of the press casting process to the higher melting point bronzes must await the development of a die steel that will withstand the severe thermal reactions incident to the process. Every large steel plant in the world is devoting some of its research facilities to the solution of this problem. Extensive progress has been made during the past 4 years and it is reasonable to assume that metallurgical research will ultimately find the answer to this problem. There can be no doubt, however, that brass press castings will find an ever growing field of industrial application.

The writer acknowledges, with thanks, the data received from J. R. Freeman, Jr., of the American Brass Company, and from Walter P. Sherman, which was used in the preparation of this paper.

Approved Codes in the Metal Industries*

Industry	Effective Date	Max. Hours	Min. Wage	Points of Interest in Trade Practice, etc.
Spray Painting and Finishing	April 30, 1934	40	40-35c	Uniform cost accounting. Open price regulations.
Copper Industry	April 26, 1934	40	47½-32½c	Special marketing restrictions. Establishment of sales quotas to individual producers of primary metal, custom smelters and secondary refiners.

*For all codes approved to date see **Metal Industry** for December 1933, February, March and May, 1934. Complete copies of any code can be obtained from the Superintendent of Documents, Washington, D. C., for 5 cents each.

Filing Aluminum

Coarse-toothed files are needed in order to prevent the aluminum cuttings from sticking between the teeth. Teeth with more shear than for steel, and with forward rake resembling saw teeth work well. Files that are chromium plated, thus having an extra smoothness of edges and surfaces are recommended. One objection to teeth that are too coarse and keen is that they are too hard to operate by hand.—**W. B. Francis.**

Sodium Citrate in Plating

Q.—Please advise me about the extent of the use of sodium citrate in the plating industries.

A.—Sodium citrate is used as an addition agent in nickel plating solutions for plating zinc base die castings. In recent years it has been replaced to a large extent by sodium sulphate. The amount of sodium citrate used by the plating industries is very small.—**E. E.**

A Brass Foundryman's Progress

By OTTO GERLINE

Gerline Brass Foundry Company, Kalamazoo, Mich.

How a Boy Grew Up to Be a Brass Foundryman. His Adventures, Joys and Sorrows, as Told to W. J. Reardon—Part 9*

DEAR BILLY:—

I arrived in C. P. Diaz, Mexico, right side up. The place is now called Piedras Niegras and is located across the Rio Grande from Eagle Pass, Texas. I got a job with the Mexican International Railroad. Old Man Jennings was Superintendent of Motive Power, and was glad to see me again. I had worked for him seven years previously, you know. My wages were one hundred dollars per month; title—Foreman of the Brass Department, although I did all the molding myself. I also had two Mexican helpers. This time I lived on the American side and walked about two miles to and from work. I believe you would be interested in a description of this foundry as well as of my work there, so here goes:

A Mexican Railroad Brass Foundry

The Brass Foundry, Pattern Shop, Tin Shop, and Store Room were all located in one building, but separated. Each had its department foreman, and while there was only one mechanic in each of them, we were all rated at the same pay as the foreman of the Machine Shop, who employed about sixty men. We had one furnace; molding sand we dug up in the railroad yard, and good molding sand at that.

The first time I worked here all railroad men except the section men were white men and so were all the mechanics throughout the shops. We had a lot of U. S. Army deserters, trainrobbers and roughnecks of all descriptions working here at that time. We had very few treaties with Mexico then and this sure was a "hot town" believe it or not. We purchased everything we needed on credit. The railroad company would notify every merchant in town when a man quit his job, and before he could get his pay he was garnisheed by everyone to whom he owed a nickel. Saloons, gambling houses, etc., were plenty full; shooting affairs every so often—in fact on every pay day and ofttimes in between. This time, after seven years, things had improved somewhat, and a man was much safer in the burg.

I hired a man as helper, a "white man" and he gave his name as George Bostwick, a tough looking bird. I found out afterward that he had four or five names and he was one of the men who had held up a Southern Pacific Express train some time previously. About all he did was to sit and watch me mould, and it seems he learned fast. I was on the sick list one day and when I came to work next day he had rammed up several moulds, using Mexican silver dollars for patterns and was pouring them in babbitt metal. I was scared pink because, had the Mexican officials seen it they would have sent both of us to the salt mines for life. He always carried a Colt forty-eight and I was afraid to discharge him. When I finally got rid of him I sure was much relieved.

"Sacred Babbitt"

Back to the foundry again. We purchased our copper and tin in St. Louis, Mo., our lead and zinc in Mexico, a brand of babbitt metal, so-called, patented and at that time having a large sale all over the country at about 62c per lb., in New York City. I could not make the Old Man believe that I could melt and mix any babbitt on the market at that time, so we babbitted locomotive as well as car brasses with this expensive babbitt. It was up to me to report to the storekeeper when any material purchased in the U.S.A. ran low. Somehow I once forgot to order this "sacred babbitt" and I was in trouble. Naturally I had to get out of it, and I did. I had Joe Maynard, Pattern Foreman, make me several patterns the same shape and size as the "sacred babbitt" and poured moulds with Mexican or antimonial lead, containing from twelve to twenty per cent antimony and some arsenic. I babbitted driving brasses and rod brasses as well as car brasses with it, and temporarily I was out of trouble. The Old Man came to me time and again, telling me they had but very few hot boxes since I came back and that some of the engines coming in to have their brasses checked looked great. That "sacred babbitt" was surely some babbitt!

I got along fine until the company received a letter inquiring why we hadn't used any of their babbitt lately. (Oh! yes, I have almost forgotten to tell you that Bob Anderson of the Machine Shop made a trademark stamp copying the trade mark on this babbitt.) The Old Man came to me with the letter and then I **was** in a mess as Andy says. I had to confess to the Old Man. He was a hot-headed Englishman and he fired me. My heart was broken as at this time I was "keeping company" with the master mechanic's daughter, Hannah Jackson, and we were engaged to be married as soon as I could save up enough money for such an event. The Old Man went down to the Machine Shop like a torpedo and fired Bob Anderson, and then he came back up to the Pattern Shop and fired

*Parts 1 to 8 were published in our issues of July, 1929; November, 1929; May, 1930; August, 1930; February, 1931; September, 1931; December, 1931, and July, 1932.

Joe Maynard. In order for us to get our money before the regular pay day it was necessary for us to have an order to the paymaster signed by the Old Man. He did not give us these, but steamed down to the Machine Shop again where they had three or four locomotives for repairs with all the brasses taken off for checking up and taking up if necessary. He asked Harry Jackson, then foreman, and now my brother-in-law, if he knew anything about this babbitt deal. Harry did not. The road at that time kept a record of all locomotives when they came in for repairs, the miles they ran, the load they pulled, etc. When they came in for repairs, they were checked up for wear of the brasses, crosshead gibbs, etc. He went through the year's records carefully and painfully. He looked them over for reports of checks, cracks, burns, etc., and found the records to be as good and in some cases better than the Special Babbitt records. He stood there and had a tussle with himself as to what to do. The babbitt worked fine, it saved the company a lot of money for which he would receive credit and perhaps a raise in salary. This was one side. To kill his hobby about that "sacred babbitt," doing it without consulting the "Hon. Superintendent of Motive Power," and Joe Maynard and Bob Anderson helping me do it, and his English bullheadedness was the other side. Well, he finally lit a cigar, put a sickly little grin on his face, grinned at Harry Jackson, and walked slowly toward the Pattern Shop and Brass Foundry, located at the other end of the yards where Maynard and Anderson were busy cursing me for getting them into this mess. As we saw him coming, I remarked "Well, here he comes with the money orders, and so it will turn out to be a perfect day." "Gosh, but you are funny," said Maynard. Anderson only looked at me, and what a look! When the Old Man came near he had a smile on his face, something he seldom had at any time, and when he came up to us, he looked at the three miserable looking Musketeers, he burst out laughing. That was sumpin as Andy would say. When he got through laughing he looked at Joe and Bob and said "You two go back to work, I want to to talk to this bird alone." He did, and how! Why, he showed that English sportmanship you read so much about. He said "I am going down to old man Jackson and put in a good word for you and Hannah, and besides I am going to get you a $25.00 a month bonus. I can't raise your wages as that is against the rules, but I can get you that bonus. Will you shake hands on that?"

Well, I almost kissed the Old Man, whiskers and all. Losing the job did not bother me so much, but I was head over heels in love and did not want to leave. Remember, this was in 1895, during the Cleveland Panic. Jobs were scarce in the United States and money more so, and there were no jobs in Mexico in my line.

Well, I worked there another six months, but was unable to save any money. Most of the white men working there were single and we would spend our money as fast as we earned it.

Cooling Metal With Wet Gates

Another incident of interest happened some time after this one. I had a pot of metal out of the furnace and was cooling it to pouring heat. I picked up a wet gate, or runner, and let it go. Well, you know what happened. The metal went up in the air, and a good portion came down over my Mexican helper who was badly burned. In fact his clothing caught fire and before I could stop him, he ran outside and down the yard. The poor fellow was in the hospital for some time. Now after the tragedy comes the comedy. The police came after me, four on horseback and two on foot. The mounted carried carbines or revolvers, a sword and a lasso; they all wore different kinds of clothes and all were barefoot. All, however, wore silver trimmed sombreros, or hats. And now the parade started, two mounted ahead, two mounted in rear, one foot police each side, and yours truly of course in the center. And so we marched from the foundry up through Main Street to the jail. I was kept there two weeks on beans and bread and water. It took so long for the company and the American Consul to get me out.

Ever since that time I never use gates, runners, or sprues to cool off melted metal, without a pair of tongs. This is perhaps a good rule to follow in any brass foundry. It certainly is practiced in our foundry.

Marriage Under Difficulties

I finally got together one hundred and twenty dollars, and made up my mind that I needed Hannah to help me save my money, if I was ever going to have anything. I told her about it; she and her parents were satisfied, and we decided to get married the following month.

Well, what happened next? The roadmen went on strike and called out the shopmen in sympathy. Not so good! I could not tell how long this strike would last, and so I told my girl that we would get married anyway and would go back to God's Country, and New York. I told her I was sure I could get work there any time as I was well and favorably known around there. She agreed, but the family let out a howl, (that is all but her father and mother; they seemed to have confidence in me.) There were seven children in the family. I was called a bum, a tramp moulder, a nobody, and the Lord only knows what else. Nevertheless, we went to San Antonio and got married by a minister friend of the family. Remember now, I still had only one hundred and twenty dollars, no more. The license cost me $5.00, the minister $5.00, and the ring $12.00. This left me with $98.00. Right after we were married I went to the Southern Pacific ticket office and asked about the fare to New York for two. "One hundred and eight dollars, not including sleeper" said the gentleman. I asked about second or third class tickets and he replied "Where do you think you are—in Russia?"

What to do now was a puzzle for a while. I finally decided to let my wife stay at the minister's home while I went looking for a job, first at the only brass foundry in San Antonio, and then to Houston and Galveston. I now learned more about the panic.

I found, however, that we could go to New York on a steamer for about $66.00, I believe it was, but had to bring our own bed clothes, or sleep on an iron bed. (This was third class alright.) I wired my wife to come to Galveston. In the meantime I bought two pillows and four blankets—cheap ones, you may be sure, Billy. We got aboard alright, and they certainly had a tough bunch of passengers in our section. My wife refused to sleep or stay in the womens' apartment, and I could not blame her. I went to the Captain and explained the situation, and he allowed us to sleep on deck, which we did. One blanket under you on a hard deck, no springs or mattress, is nothing

to brag about for a bride and groom on their honeymoon, now is it? Well, we got to Key West for a stopover. Key West, it may interest you to know, had then about 35,000 population (1896). It now has about 12,000.

After eight days during which time my wife was seasick seven days, we landed in Brooklyn, New York, with total cash on hand $2.65. My only hopes were staked on the chance that Mrs. Cox (bless her Irish heart) my old boarding house "missus" was still alive; then I might be okay. So I had them take our one little trunk, tied up with clothes line and containing all our worldly goods, to Jersey City. Delivering the trunk and paying our fare to Jersey City left me, or us, with 15c. at the Cortlandt Street Ferry, at the foot of Newark Avenue in Jersey City. I could not wire for money as I had no one to wire to. It took another dime for street car fare to Grove and Newark Avenue, and I arrived at Mrs. Cox's door with a good American nickel, a wife and no job, and it was raining like Hell. Some honeymoon! don't you think, Billy? I'll say it was!

I rapped at the door and Mrs. Cox in person opened it. She was so surprised she couldn't say anything for a minute, and then simply "Otto Gerline! and who the devil is the redhead with yeh?" "This is my wife, Mrs. Cox." "Lord have mercy on us!" says she. "On us is right, Mrs. Cox," I replied and meant it. "Mrs. Cox, I have a wife, no job, five cents, and just landed from San Antonio, Texas." "Go on with your blarney," she said. "Mrs. Cox, it is the truth, and I trusted that you would take care of us until I find work." She answered "As long as I have a dollar, you can have fifty cents of it, me boy. I have no room for you, but sister Mary lives right around the corner on Grove Street, and she has a hall bedroom, and I am sure you can have that. But tell me, Otto, what do you think Mamie Murray, and Kate O'Hara and Mamie Ross and Sadie Hart and Betty Murphy are going to say when they hear about it. They are all single yet and waiting for you, you blackguard" and then she laughed that happy laugh of hers that shook her two hundred pounds all over. She could laugh until tears streamed down her cheeks. (She has long since gone to her reward, but I hope some of her children may read this.) It might be of interest to you that Otto Kramer (now running a brass foundry of his own in Milwaukee, and who afterwards married Mrs. Cox) and I boarded there a long time when she was very poor, with five children and an invalid husband to support. We brought her in new boarders, sometimes paid her a few weeks in advance so that she could furnish more rooms and take in more boarders. She was good to us roughnecks in those days, and a regular mother to us. I had been away a good many years, and in the meantime her husband had died. He left her some insurance and some back pension, some of the older children had married, and she received a widow's pension for herself and children. In other words she was on Easy Street, and I was down—but not "out". She was able to do me a good turn and with her big Irish heart she did it and I don't mean "maybe".

That evening my wife took her first good meal in about seven days and as for myself, I went into that ham and cabbage like nobody's business after living on hash and stew dished out in tin plates for eight days.

If I were a writer like my friend Charles Francis Coe, author of "Al, the Champ" etc., I would write a book on this with the title "A Brass Molder's Honeymoon". It may be he will do it if he sees this.

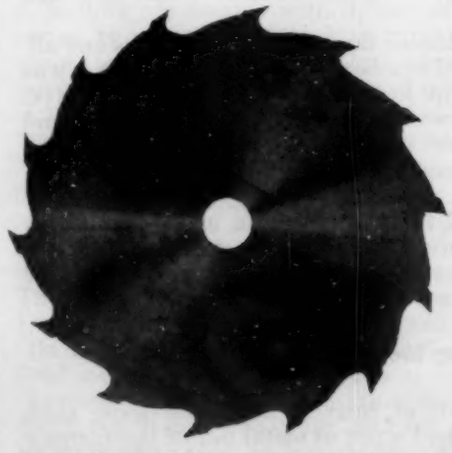
It was now up to me to show my wife's folks that they were all wrong about their sister's husband. In my next letter I will tell you how I made out.

And now with another good word to the Irish, including your good self, I will close with best regards to you and Mrs. Reardon.

Sawing Aluminum

THE teeth of saws for aluminum should follow the design of those on milling cutters, but the angles of front rake, or undercut, may be even greater. Coarse-tooth saws are better than the fine-tooth ones, because plenty of chip room must be provided, and the curves between the teeth must be large and smooth. The bottom of the spaces, known as the gullet, must have rounded corners, not only to give an easy flow to the chips but to prevent cracks starting in the saw. The illustration shows a saw of this kind.

Saw teeth may have a side rake of 15 degrees. The use of hook teeth tends to pull the work into the saw and risks injury to the work, saw and machine. Therefore, a hooked-tooth saw requires that the work and the feed be held securely in check in order to prevent accidents. Saws with high-speed steel inserted teeth, or with carbide tipped teeth are very excellent for aluminum. The style of saws having teeth alternating with rounded and flat front surfaces are recommended, because this combination of teeth breaks the chips and removes them from the slot readily. The front face of the teeth should never have negative rake for aluminum as it may have for brass. It is the practice to use the highest speeds with fine feeds when sawing.—**W. B. Francis.**



Circular Saw with Inserted Hook Teeth

The Welding of Copper

By J. F. SPRINGER
New York

The Practical Details of Welding Copper by the Oxy-acetylene Flame

OF the present welding methods, that which employs the oxy-acetylene flame is the most generally used when the metal to be welded is pure copper.

The melting point of copper is around 1900° F., so that one would expect little or no trouble in getting the metal to a proper point. However, this material is a notable conductor of heat. This results in the dissipation of a good deal of the heat poured in by the welding flame. It is rapidly carried off into adjacent parts of the work and thence radiated off into the air.

The welder must be on the alert. While he is engaged in watching the new material which he is putting into the V-groove, the sides of the V may lose enough heat to get rather solid. If this takes place, the result may be a defective weld due to imperfect coalescence between new metal and old on the sides of the V. One or more methods of securing assistance to the welder will be found later in this article.

Tensile Strength Low in Heated Copper

It is necessary to pay attention also to the fact that heated copper is rather poor in tensile strength. As a weld cools off and serious contraction takes place, the tensile strength may be unequal to the avoidance of cracks.

Welding Rod

When properly deoxidized copper is employed, the best results are obtained when the welding rod is similar to the metal of the work. Copper welding can be advantageously carried out when both the work and the rod are of deoxidized copper. It is recommended by one authority that a trifle more silicon should be added to copper than is absolutely requisite for the result of complete deoxidization. The excess remains in the copper and acts as a protective agent during the welding.

Some Chemical Matters

It is highly desirable for the welding operator and the foreman to understand certain characteristics of the oxy-acetylene welding flame in general, how to secure correct adjustment for copper and copper alloys and how to maintain that adjustment throughout the job. Otherwise, troubles are likely to occur.

There are three principal adjustments of the flame, only two of which are proper to use with copper and alloys containing high percentages of copper.

I reproduce here from Maj. James Caldwell a diagram illustrative of the oxy-acetylene flame when it is adjusted to the normal condition. This is the adjustment for pure copper. And it may be convenient, in actual practice, to start with this adjustment and then make the change necessary to produce the one proper for other services.

The total flame is a large affair. The temperature varies from point to point. From the tip, a mixture of more or less pure oxygen and more or less pure acetylene emerges. As the temperature encountered is a high one, the acetylene in the mixture splits up into two gases—carbon and hydrogen. Accordingly, immediately after this splitting up, or exploding action, we have three different gases.

The innermost core of the flame, next the tip, is brilliantly white. Here the three gases exist separately and

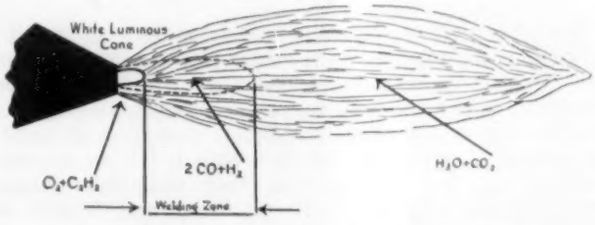


Diagram of the Oxy-Acetylene Flame

the whiteness is due to incandescent carbon. When the form, or outline, of this very white core is sharply defined and when the inner white flame and the outer envelope are the only flame regions distinguishable separately, the flame is exactly **neutral.** This sharpness of outline of the inner core is quite useful, because by noting when we get the flame to produce it, we are able to get a standard, exact adjustment. It is easily and rapidly done.

The main flame extending far beyond the core and of very considerable size has no very definite color, but it is important.

There is a third region, indicated by the dotted line but not clearly discernible as a separate thing during neutral adjustment. Two of the three gases are understood to get together in this place, but the old partnership between carbon and hydrogen (C_2H_2) which existed in the form of acetylene is not renewed. The carbon combines with oxygen instead and forms the gas, carbon monoxide (CO). This is the gas which overcomes and kills people in garages.

Now the break up, or sudden decomposition, which occurs when the acetylene emerges from the tip produces heat, which is largely carried on to a further point. Similarly, the combination of the carbon with oxygen also produces heat. The two evolutions of heat together produce one of the hottest of all hot spots. Its position is a little forward of the outer end of the brilliant, white core.

Between the outer end of the core and the tip of the dotted-line section is the welding region. A tremendous temperature—say, 5,500° F.—is produced at the hot spot; and pretty much all through the dotted line region we have exceedingly high temperatures.

In the large region of the outer flame, the temperatures run down to relatively low points. The carbon monoxide (CO) obtains more oxygen and a lower temperature here and the two combine to form carbon dioxide. The hydrogen also finds oxygen and a reduced temperature and these two combine to form steam, water vapor, water. Some of this oxygen may come from an unused portion of the oxygen flowing through the tip, but the major part of the oxygen comes from the surrounding air.

Proper Adjustment for Copper

A good useful rule to get a suitable adjustment is the following: Get neutral adjustment by securing a sharp outline of the core flame. If an excess of acetylene is wanted, then the operator may either reduce the flow of oxygen or increase the flow of acetylene. The sharp outline will promptly disappear and an intermediate cone will come into view.

It will be safe to make sure of adjustment over and over again, as the welding job goes on. The welder who welds with neutral adjustment has a test all the time. By noting the core, he can tell whether any change has intervened and immediately correct it.

The Enveloping Flame

The large part of the flame outside of the core and the welding region may be made useful to the welder of copper. In this region, the hydrogen (H) and the carbon monoxide (CO) are both eager for oxygen. They may get a certain amount from what is left over from the welding portion of the flame, but they must get from the surrounding air the bulk of what they ultimately obtain. This body of gases is a reducing flame, and capable of affording a certain amount of protection to heated copper.

One way of obtaining this protection is by flooding a reducing flame over the hot copper. The big envelope of the oxy-acetylene flame is just such a protective agent and is capable of being used as a covering blanket.

Second Method of Adjusting Torch

As to securing the **acetylene adjustment** of the torch, the welder may prefer an alternative method. It may seem easier to some than the one already described, where it is necessary to start with a well-defined inner cone of a brilliant white.

Begin by adjusting the flame to produce some kind of an inner white cone. Then make small changes until there are **three** fairly well marked off flames—an inner white cone having a feathery outline, a big outer envelope of a bluish tinge, and a third cone, rather well defined, and located between the inner white cone and the bluish envelope.

By reducing the acetylene or increasing the oxygen, the intermediate cone can be made to get smaller and smaller. This change is to be produced very gradually. Finally, the intermediate cone will vanish, and there will be only a big outer envelope and a sharply defined, intensely brilliant inner cone. The adjustment has now been brought to **neutral.**

The Welding Operation

The welding is to be done with the tip of the white cone near to but not in contact with the metal. A distance of ¼ to ⅜ inch is about right.

It is undesirable to have the tip of the white cone too far from the metal. If the welder gets careless as to this point, he may expect an increased oxidizing effort of the flame.

If the white cone itself comes into contact with the molten or highly heated metal, we can not expect good results. Free oxygen is in this cone.

Position of the Torch

The torch is to be held so that the jet will be directed vertically or almost vertically downward. The reader will please note that this is quite different practice from the ordinary.

There are two objects in view. (1) This tends to avoid driving the molten metal along the groove provided for the seam by beveling the edges of the work. Another object (2) consists in protecting the weld and the work from the atmosphere.

Heat Insulation

So troublesome is the rapid heat conductivity of copper that there may be difficulty in keeping enough heat at the proper places to melt the new metal and to maintain the sides of the V at a sufficiently high temperature. It is not enough to melt the new metal. The old must coalesce with it.

The vertical position of the torch doubtless helps to some extent. In order to provide further assistance, a sheet of asbestos may be laid on the welding table and the work placed on the asbestos. Then, asbestos sheets may be laid on top of the work, a sheet to either side of the region of the seam. We thus prevent conduction away into the metal table-top and we prevent loss by radiation from the upper surfaces of the work. Conduction away through the work to right and left still remains.

It is always wise to pre-heat the work.

Some Remarks

In welding electrolytic copper, two troubles arise: (1) The cuprous oxide tends to produce cracks and also distributes itself between grains in the copper, thus reducing the strength of the metal seriously. (2) Carbon and hydrogen, both of which are present uncombined in parts of the welding flame, tend to make trouble by the surface formation of sponge copper. This trouble might be corrected by the use of a welding rod of suitable composition. But hydrogen has penetrative power when the copper is red hot and so causes trouble.

By using deoxidized copper, all these troubles are avoided. It is recommended that, even in cases where the copper to be welded is electrolytic, a welding rod of deoxidized copper be employed.

A red heat is often necessary in the copper work for some distance from the weld, because of the extraordinary flow of heat away from the V groove.

Stripping Silver from Brass

Q.—Is there a strip that will strip Silver Plated sheet brass without pitting or roughening the brass which is yellow brass of 1/32 of an inch thick? The Silver is direct on the brass.

A.—An acid strip made of 5 parts of sulfuric acid and 1 part of nitric acid can be used to strip silver from brass without a great deal of damage to the brass.

The strip should be used hot for fast stripping and all water must be kept from the strip.—**O. J. Sizelove.**

Calculating the Karat of a Gold Melt

Q.—I HAVE three lots of old gold, and expect to melt them together; I want to know what karat I will get when this is done. One lot weighs 4 ounces and is all 18-k; the second weighs 10½ ounces and is 14-k; the third is about 6 ounces and is 10-k.

A.—You can calculate by simple arithmetic what your final button should weigh, and its fineness, assuming that you would make a perfect melt. However, you must not expect to make a perfect melt. Therefore you must expect a little loss in total weight, and probably a little gain in fineness.

(The term "karat" as applied to gold, means twenty-fourth parts. That is, 14-k gold consists of 14/24ths gold, and 10/24ths other metals such as copper or silver. 24-k gold is pure gold. The term "fineness" refers to parts per thousand. The pure gold is called 1000 fine; if three-quarters of an alloy is gold, it would be called 750 fine.)

Another fact to be remembered is that much of the old gold now being melted up is incorrectly stamped, due to the fact that in the past the stamping laws were none too well obeyed, and dishonest stamping was more prevalent than it is to-day.

To answer your question: Probably your metal is in the form of old jewelry, old spectacle frames, or the like. This means considerable surface for the collection of dust, grease, and traces of moisture, all of which disappear on melting. Also, on melting, some of the base metals will boil away, especially zinc. If you are an experienced and careful melter, your loss will be relatively small.

But suppose that you should make a perfect melt: The weight of the resulting button would be 4+10½ +6 ounces, or 20½ ounces.

Now to calculate its fineness:

Lot 1 is 18-k; in other words 18/24 fine gold, or ¾ fine gold. Three-quarters of 4 oz. is 3 oz. This lot then contains 3 ounces of fine gold.

Lot 2 is 14-k; in other words 14/24 fine gold, or 7/12 of 10½ oz. This is 6⅛ ounces fine gold.

Lot 3 is 10-k, or 10/24 fine gold; that is, 10/24 or 5/12 of 6 ounces. That figures out as 2½ ounces fine gold.

Your final button, then, which would weigh 20½ ounces, would contain 3+6⅛+2½ ounces fine gold,—total 11⅝ ounces fine gold.

You can see that this button is more than half gold, therefore more than 12-k. Expressing it in other terms it is

$$\frac{11\frac{5}{8}}{20\frac{1}{2}}, \text{ or } \frac{93}{164} \text{ fine gold,}$$

which is the same as 567/1000, or 567 fine. That figures out to 13-6/10 karats. (Full 14-k is 583/1000 fine.)

In actual practice, your button would weigh less than 20½ ounces, and its fineness would be something above 567, depending upon the character of the base metals present, and your skill in melting.

Jewelry Metallurgist.

Hard Tipped Tools for Aluminum

THE latest in design and construction of tools for machining aluminum has been the adoption of hard metal plating, hard material overlays by means of the electric arc and oxyacetylene flame, and the use of block tips of extra hard material. The metal chromium is used for the plating method; while for overlays, block tips and the like, tungsten carbide, tantalum carbide, silicon carbide, stellite, the diamond, etc. are used. The diamond is the hardest material known, but it is brittle, requires a great deal of time to put it in shape for a machine tool, and its first cost is excessive for any but very special tools. The manufactured materials, such as the carbides, closely approach the diamond in hardness, and they can be cast into any desired shape and size for use as tool tips. These blocks are brazed into a dovetail or groove on the end of a steel bar or shank that can be held on the machine. While the manufactured extra hard materials are somewhat brittle and must be very well supported by the steel shank, they can be protected from the cutting shocks, they give a quality service that is very pleasing to production managers. A right-hand tipped turning tool is shown in the illustration.

Right Hand Lathe Tool, Hard Tipped

W. B. Francis.

"Tone Effect" on Gold

Q.—Enclosed are two samples. One is toned and the other is not. Please tell me what gold to use; the formula for the solution; voltage, etc.

A.—The tone effect that you refer to on the sample submitted is placed upon a regular gold deposit.

After plating in a 24 karat gold solution and lacquering the tone effect is placed upon the work by using burnt amber ground in oil and thinned with turpentine to proper consistency.

After painting this material upon the work, the excess is removed from the highlight with a cloth.

With a little experimenting you should have no trouble in duplicating the finish.—**O. J. Sizelove.**

A Large Lighting Fixture Plant

A Description of the Manufacturing Facilities of the Lightolier Company From Casting to Finishing

THE history of the Lightolier Company is one that deserves special comment. They have been in business some thirty years and in the course of that period, the industry has met with some great upheavals. In the past few years, particularly, some of the largest concerns in the lighting fixture field have been unable to withstand the extremely adverse times with the result that they are out. Large and small concerns in great numbers have closed their doors in the past two or three years.

In view of the almost compiete cessation of building, it is most remarkable that the Lightolier Company with its large manufacturing and selling organizations were able to survive. Some of the reasons for this are apparent in the remarkable organization and plant, which is located at 346 Claremont Avenue, Jersey City, N. J. One is struck with the completness of the institution.

Modelling. No fixture design is better than the art of the modeller who carries out the artist's sketch

French Sand Castings From Match Plates

The foundry, where brass, bronze and aluminum castings are made, is equipped with modern squeezers and casting machines. While it was expected that plates would be used on green sand work, it was especially noteworthy that the same procedure was followed in the French Sand Department. Here, as elsewhere, great attention was given to the quality of the work.

On a floor below this, in a room that had broad daylight streaming in on all sides, were many modellers and chasers, of course very highly skilled artisans. These men were engaged in making new styles of models and patterns.

Chasing. Fine details in castings are secured only by the hand operations of skilled artisans

Casting. Uniform castings must be secured. Here is a pot of brass being drawn for French sand casting

Leading off from this was a room which held various and sundry machines, such as grinders, drill presses, screw machines, etc. in regular order and battery formation.

Special Die Casting Equipment

On this same floor was another foundry where die-castings were made. As in almost every department,

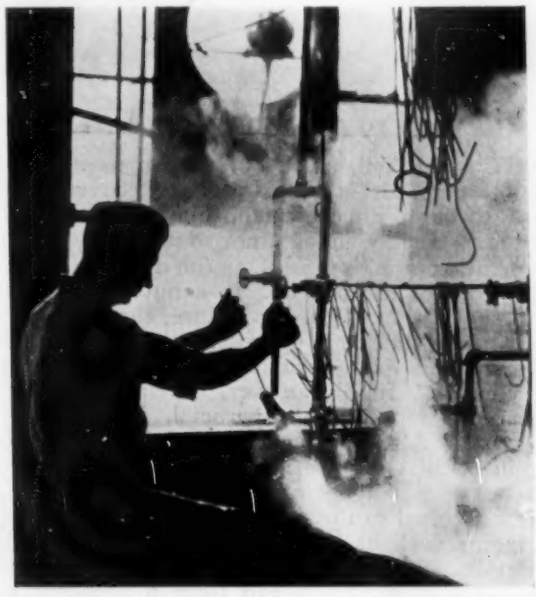
Hand Forging. The finest forged fixtures are hand forged

there was a device that was originated in this plant. In the die-casting foundry there were specially constructed machines. While die-casting machines as such are no novelty, in this case, they were made to take dies for gravity pouring, and operated by a huge lever so that they worked with a minimum of effort. This not only did away with the handling of the molds, but kept them from being banged up and

Spinning. One of the essential operations in fixture manufacture—which like anything else can be done poorly or done well

increased the output of the operator at least fourfold.

In this modern steel and concrete structure each floor is 20,000 ft. in area. One of the outstanding features is the extreme cleanliness of each department. The press room, polishing and plating rooms were as clean as the lacquer or fitting rooms, which were immaculate. Four different exhaust systems kept the air in the various departments that required them in perfect condition.



Plating. This department puts on the finishes which make the fixtures beautiful

Inspection departments from the foundry to the packing department make sure that no article would go out unless in perfect order. In the assembling department a special section is devoted to the testing of every article made and an O. K. stamped by proper inspectors, is the seal that permits the article to be shipped. Specially constructed corrugated boxes with inner forms, make sure that the merchandise would arrive in proper condition to its destination.

Close Grained Aluminum

Q.—I am writing to you to obtain information pertaining to aluminum. I have been having trouble with castings which are porous. These should be close grained for a high polish. I am using an alloy of 50% copper and 50% aluminum which is mixed at 96% of good scrap with 4% of the alloy, but I am not having very good success. I am pouring the metal at the lowest temperature that will run the casting. Can you give me any information on mixtures for aluminum which will make a close grain casting that will stand a high polish?

A.—We suggest that you try an alloy of 33 1/3% silicon, 33 1/3% copper, 33 1/3% aluminum and pour into ingots; and to your 96% of good scrap aluminum, add 4% of this alloy.

If this will not give you the results you desire, increase the percentage of the alloy, say 6%. We are inclined to believe the 6% will give you the best results. If not, add 8%. This will help you to obtain the results that you wish. Use refined silicon, obtainable from the refiners.

W. J. Reardon.

EDITORIALS

Pro and Con N R A

THE bombshell which burst upon us in the form of the report of the National Recovery Review Board through its chairman, Clarence Darrow, has resulted, strangely enough, not so much in widespread argument or in taking sides, as the desire of most men to stay out of the mix-up. In a nutshell this Board stated that the N. R. A. is a failure, that it is harmful to American industry, oppressive to the small business man and that it should be replaced by "socialized control." In his answer, General Johnson, describes the report as "superficial, intemperate and inaccurate." Mr. Richberg, counsel for the N. R. A., gave in detail (but just as hot) an analysis to refute the report point by point.

No individual can possibly analyze these conflicting statements without a great deal of time for studying the details. Probably also, no individual, busy as he is with his own affairs, can form a properly broad judgment on the situation as a whole. That, we must of necessity, leave to those in the center of things concerned with the problem as a whole.

The N. R. A. has not been the cure-all which many simple-minded folk expected. There is no doubt that it has tackled a huge job for which adequate preparation was impossible because of the haste necessary. Inevitably many mistakes were made. Possibly some of them are major errors which must be corrected. The measure was drawn up to expire in two years. The chances are that we shall still be working on codes and revisions when the date of expiration arrives.

How many are there who expect the N. R. A. to lapse completely on that date? Industry has had a taste of legalized co-operation. It has worked imperfectly to be sure but many state that they have found it very much better than the dog-eat-dog methods which preceded the Code Era.

Copper Complications

THE Copper Code is in operation and since it is attempting not only stabilization of labor conditions and prices, but also the allocation of sales and the control of output, the problem which the Code Authority faces is very much greater than in most other industries. It is working not only with the producers of primary copper but with the secondary smelters and refiners, and last, but far from least, the copper consumers.

In many cases these consumers are subsidiaries of producing companies, like American Brass, Anaconda Wire and Cable, the Chase Companies, General Cable, Revere Copper and Brass, and Phelps-Dodge Copper Products. These consumers have agreed to buy from 60 to 100 per cent of their requirements of "Blue Eagle" copper produced in accordance with the rules of the Code. It may be that by controlling such a large proportion of the copper industry, the Authority will exercise adequate control. It remains to be seen, however, whether the complications of the Code, its varying quotas of production and consumption and the large number of small producers and consumers who are not yet aligned, will present difficulties which cannot be overcome.

It will be a most interesting experiment in controlling an industry.

Preventing Strikes

THE emergence from every depression has brought with it a plague of labor troubles. This depression, perhaps the greatest we have ever experienced, is no exception to the rule. We have had strikes and we are threatened with more.

It was presumably with this situation in mind that a bill was presented by Senator Wagner to set up the machinery whereby strikes would be unnecessary (although they are specifically permitted). The bill it is stated, is intended to equalize the bargaining power of employers and employees. It proposes to do so by enforcing the closed shop. It restrains employers from impairing in any way the right of the men to join a labor organization of their own choosing. It insists that they deal with representatives of employees and make every reasonable effort to make and maintain agreements with them. It stops them from participating in the formation or management of a labor organization or contributing to its support. So far, so good, but that does not tell the whole story. A storm of criticism has arisen against this bill because of the practical effects which it is likely to have in operation.

In the first place, as it was originally drawn, it imposed prohibitions upon employers but placed none of any kind on labor union activities. There was no insistence that the unions were required to come to agreement, as there was for the employers. It specifically retained the right to strike but said nothing about a similar right on the part of the employer to shut his plant. Its provisions were so drawn that in practice it would be necessary for every employee to join the union which controlled a majority of the men in any shop, whether the men wanted to or not.

In order to get a better view of the situation it is necessary to go a little further back than the written provisions of the bill. It is the claim of labor that there is coercion by employers, preventing men from

joining the organization which they choose. No doubt this has happened in some cases. It is claimed by employers that the American Federation of Labor is making a drive for power. Probably there is cause for this charge. If we were under a dictatorship, our problem would be simple. No one would be allowed any choice except the dictator. But as we are still a democracy where the voices of all sides must be heard, it is obviously unsafe for any one element to be given strength disproportionate to its numbers.

Labor has been given the right to be recognized and bargained with collectively under Section 7 A of the National Recovery Act. The Unions' strength depends upon their ability to persuade men into their ranks. The National Recovery Act also specifically forbids coercion or discrimination by employers. They must bargain with any representatives chosen by the men. Wherein does labor need further protection? If discrimination exists it can be shown and the employer brought to time by the N.R.A.

The closed shop in any form has always been unpopular in the United States. There is no more inherent right to have a shop closed to non-union men than there is to have it closed to union men. The open shop, that is, open to everyone, allows the worker free choice to join any organization that he decides is best for him.

What industry needs is not more laws on this question, but properly constituted boards to adjust disputes under the present laws.

Polished or Unpolished Surfaces

IN VIEW of the increasing interest in bright plating, we were struck by two contradictory reports in the literature.

J. Korpiun and Ernst Vogel in Germany, found that if a nickel deposit is polished before chromium plating, the throwing power of the chromium solution drops; that in general the throwing power of chromium plating baths is lower on polished than on unpolished nickel deposits. On the other hand they found that very bright nickel deposits of fine grain improved the throwing power of chromium solutions over them. A similar study by J. Claymann, published in a French journal points out that the passivity of a nickel plate is reduced by polishing and that this operation is necessary because it is very difficult to deposit one metal on another in the passive state. The last named author states that it is useless to obtain a bright nickel coating if it is later to be chromium plated. While a chromium coating should be deposited which requires no polishing, in order to preserve its brightness, such a coating cannot be obtained without polishing the nickel beforehand in order to reduce its passivity.

These are definitely conflicting views. We should be glad to hear what has been the experience of American workers in this field.

An Indispensable Addition Agent

METAL consumption figures of more than ordinary interest were made public in a recent report of the International Nickel Company. A table was given which shows that the American output of nickel is consumed for diversified uses, approximately as follows:

Nickel silver and nickel copper alloys—18%
Pure rolled nickel (radio, chemicals, coinage)—17%
Nickel for plating and undercoat for chromium—10%
Monel metal—9%.
Miscellaneous uses (nickel, brass and bronze, nickel aluminum, white gold, etc.)—4%
Heat resistant and electrical alloys—3%
Alloy steel—35%
Alloy cast iron—4%

How much nickel then actually goes into these fields? The world consumption of nickel in 1933 is estimated at about 96,000,000 pounds. The consumption of nickel by the United States and Canada was about 57,000,000 pounds or 60 per cent of the total. This would give us some interesting deductions. For example, the nickel consumed in electroplating totals between 5 and 6 million pounds. The nickel consumption in nickel silver and nickel copper allows is over 10,000,000 pounds and the annual consumption of these alloys is therefore well over 100,000,000 pounds on this continent.

Too detailed an analysis is not possible. The figures are not yet obtainable in a sufficiently broken down state to enable us to make accurate estimates. We believe, however, that many will be surprised by the considerable tonnages which have grown up unobtrusively in a wide variety of small quantity uses.

Competition In Aluminum Production

ANNOUNCEMENT was recently made in the daily press of a project which is under consideration in the Tennessee Valley in connection with the huge power development under construction A group in Chicago has filed application to build an aluminum reduction plant, which will use Government electrical power. It is the contention of this group that "this project will break the closely guarded 'aluminum trust', make the metal more available throughout the nation by cutting the cost, provide widespread employment and give the Tennessee Valley Authority a great industry." It is the plan of this corporation to establish a plant at Decatur, Ala., where it would employ about 9500 people. The project is under examination by a special board of experts who will report to the Public Works Administration.

It is noteworthy that one of the features of this application is a request for a loan of $20,000,000 from the Public Works Administration. In other words, it contemplates the use of public money for a private enterprise, which will enter into competition with existing business.

We should all be astounded at the serious consideration of such a radical departure from our Government practice in the past if we had not already been hardened to revolutionary changes in the last year. Perhaps the situation in this industry merits such a move. Only a thorough and unbiased investigation can determine such a decision.

But what if there should be a flood of applications for public money for private industry if this request is granted?

New Books

The Casting of Brass Ingots. By R. Genders and G. L. Bailey. British Non-Ferrous Metals Research Association, Reguart Buildings, Euston Street, London, N. W. 1, England. 6" x 9½"; 191 pages. 15s, plus 6d. for postage.

This book presents in summarized form the results of the research on brass ingot casting which has been carried out by the British Non-Ferrous Metals Research Association over a period of several years.

The book opens with a historical chapter and a description of commercial practice, followed by a detailed account of the characteristics of brass ingots and rolled strip and of the causes of the main types of defects in them. The main portion of the book is devoted to a detailed discussion of the various factors influencing the quality of the ingot, the chief points dealt with being the formation of the ingot from the liquid metal, the effect of casting temperature, speed of pouring and feeding, dimensions of the ingot, effect of mould coating and materials for the construction of ingot moulds. Modified and improved casting methods are suggested and special casting methods such as the Durville process are discussed in some detail.

While the main value of this book lies in its utility to the manufacturer of brass strip ingots, particularly for cold rolling, such an investigation necessarily produces information which is of general application in the casting of ingots of any material, size or shape, and the book should prove of great value to those directly or indirectly interested in metallurgical practice. It is profusely illustrated, and contains much of the experimental evidence on which the authors have based their conclusions.

Cost and Production Handbook. Edited by Dr. A. P. Alford. Ronald Press Company. 4½" x 7"; 1544 pages. $7.50.

This is a unique handbook, the first of its kind ever published. Dr. Alford is a nationally known figure in industrial engineering and he has been assisted in this book by a board of 80 specialists. It is the aim of the work to be of practical value to production executives down to foremen and overseers.

Some of the representative sections in the book are headed as follows:

Statements and Reports; Production and Expense Budgets; Factory Organization: Measures of Factory Performance; Production Planning and Control; Simplification and Standardization Purchasing; Inventory Control; Rate Setting; Incentive Plans; Machinery Handling Materials; Cost Accounting Methods; Estimating Production Cost; Operating Charts.

Chemical Engineers Handbook. Edited by John H. Perry and W. S. Calcott. McGraw-Hill Company. 4½" x 7"; 2609 pages. Introductory price $7.50; regular $9.00.

This book is a manual of chemical engineering data and practice compiled by 60 specialists and 150 chemists and engineers. It is intended to take a place as a standard handbook in the chemical engineering field, just as mechanical, civil and electrical engineering have their compiled central sources of information. The best description is a list of some of the chapters, headings:

Physical and Chemical Data; Distillation; Drying; Mixing; Mechanical Separation; Crushing; Grinding and Pulverizing; Materials of Construction; Material Transportation; Fuels; Power; Electrochemistry; Cost Accounting; Patents and Patent Law.

Bacon's Publicity Manual, which was first published last year, has just appeared in its 1934 edition, containing a complete and up-to-date directory of 1600 American and Canadian business and trade papers, classified by markets, with an analysis of the types of editorial material used by each publication. The directory section of the manual is preceded by a comprehensive discussion covering the handling of editorial publicity for every conceivable type of product.

Book Notes

Metallurgical Analysis by the Spectrograph. By D. M. Smith British Non-Ferrous Metals Research Association. 10s, 6d.

Procedure Handbook of Art Welding Design and Practice. Lincoln Electric Company, Cleveland, Ohio. $1.50.

Industrial Radiography. By St. John and Isenburger. John Wiley and Sons, Inc., New York. $3.50.

Metal Statistics for 1934. American Metal Market Company, New York. $1.00.

Minerals Year Book for 1932-1933. By O. E. Kiessling, U. S. Bureau of Mines. Obtainable from the Superintendent of Documents, Washington, D. C., for $1.25.

Metallurgy of Iron and Steel. By Bradley Stoughton. McGraw Hill Company. Price $4.00.

Safety Instruction Cards. Practical Safety information for the man on the job. National Safety Council, 20 N. Wacker Drive, Chicago, Ill. A wide variety of topics covered by these cards; obtainable for 25 cents each.

Chemical Formulary. Chemical Formulary Company, Brooklyn, N. Y. A new book on formulas, recipes in a wide variety of industries. $6.00.

Easily Interpolated Trigonometric Tables. By F. W. Johnson. Simplified Series Publishing Company, San Francisco, Cal. $1.70-$2.45 depending upon binding.

Safeguarding Industry Against the Pilfering of Ideas. By H. Creange. George Grady Press, New York. $1.50.

Chemical Engineering Catalog. Chemical Catalog Company, Inc., New York. 18th Annual Edition. $10 for a new copy; $2 with old copy in exchange.

A. S. T. M. Standards, 1933. American Society for Testing Materials, Philadelphia, Pa. In 2 volumes. $7.50 per volume or $14 for two.

Crystalline Structure in Relation to Fatigue of Metals. By A. J. Gough. American Society for Testing Materials, Philadelphia, Pa. $1.00.

Book of A. S. T. M. Tentative Standards for 1933. American Society for Testing Materials, Philadelphia, Pa. $7.00-$8.00 depending upon binding.

Proceedings of the 36th Annual Meeting of the American Society for Testing Materials. Two parts. Volume 1.

Committee reports, new and revised tentative standards, tentative revisions of standards; volume 2, technical papers. $5.50-$7 per volume depending upon binding.

Technical Papers

Aluminum Alloy Forgings. British Standards Institution, 28 Victoria Street, London, S. W. 1, England. Recently issued: No. 532—1934, Light Aluminum Alloy Forgings for General Engineering Purposes; No. 533—1934, Y-Alloy Forgings for General Engineering Purposes. Price, 2s.2d. each, postpaid.

Thermal Expansion of Bearing Bronzes. By Peter Hidnert, Bureau of Standards, Washington, D. C. Research Paper RP665. Reprint from Bureau's Journal of Research, Vol. 12, March, 1934.

Abstract: This paper gives data on the linear thermal expansion of cast bearing bronzes (copper-tin and copper-tin-lead alloys) at various temperatures between 20 C (68F) and 200 C (392 F). The results obtained on heating and cooling are shown in figures 1 and 2. Coefficients of expansion for various temperature ranges are given in table 2. The coefficients of expansion obtained in the second tests are generally higher than those obtained in the first test. The addition of tin to copper, or lead to copper-tin alloys increases the coefficients of expansion. Equations were derived which show the relationship between the tin content and the coefficients of expansion of cast copper-tin alloys and between the lead content and the coefficients of expansion of cast leaded bronzes with a copper-tin ratio equal to about 7.

Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

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WALTER FRAINE

Bluing Steel

Q.—How can I produce a dark blue finish on bright steel? I have heard there is a formula for a solution used at room temperature which will give the color by swishing the work around in it.

A.—We know of no dip that can be used successfully to produce a uniform dark blue finish upon steel or iron. You can use a heat treatment method which gives very good results.

O. J. S., Problem 5,297.

Cadmium Analysis

Q.—I am sending to you a sample of cadmium solution for analysis.

I am having some trouble with this solution. The chief difficulty is the color. I am unable to get a clear white deposit with a lustre. The deposit has a gray brown color when produced with a current density of 10 to 15 amp. per square foot surface; at 25 to 30 amp. it is whiter, but cloudy and not satisfactory. The throwing power isn't what it should be in recesses, and there seems to be an excessive amount of hydrogen gas; also a very distinct odor of ammonia. I do not know the original formula of this solution, but do know there haven't been any chemicals added to this solution in the last three years except sodium cyanide and a patented brightener. The metal content is kept up from the anodes.

A.—Analysis of cadmium solution:

Metallic cadmium	2.42 oz.
Free cyanide	7.26 oz.
Carbonates	8.12 oz.

From the analysis we would expect the high carbonate content to be the cause of your trouble. We suggest that one-half of the solution be taken from the tank. Then replenish tank solution with water and add 60 lbs. cadmium oxide and 150 lbs. sodium cyanide.

O. J. S., Problem 5,298.

Brush and Satin Chromium

Q.—Will you kindly furnish us with the necessary information to produce brush, satin and butler finishes on steel stampings which are to be copper, nickel and chromium plated? These parts are 8½" wide x 15" long and, are stamped out of high quality cold rolled steel and of about 18 gauge thickness.

USE THIS BLANK FOR SOLUTION ANALYSIS INFORMATION

Fill in all items if possible.

Date.....

Name and address: .....Employed by: .....

Kind of solution: .....Volume used: .....

Tank length: .....width: .....Solution depth: .....

Anode surface, sq. ft.:.....Cathode surface, sq. ft: .....

Distance between anode and cathode: .....Kind of anodes: .....

Class of work being plated: .....Original formula of solution:.....

REMARKS: Describe trouble completely. Give cleaning methods employed. Send small sample of work showing defect if possible.

Use separate sheet if necessary. _____

_____

_____

_____

NOTE: Before taking sample of solution, bring it to proper operating level with water; stir thoroughly; take sample in 2 or 3 oz. clean bottle; label bottle with name of solution and name of sender. PACK IT PROPERLY and mail to METAL INDUSTRY. 116 John Street, New York City.

We might also mention that our polishing and buffing lathes operate from 1750 to 2600 R.P.M.

Our work has always been bright finish, and we have had no experience whatever with the above mentioned finishes. We understand that the above finishes are subject to staining from handling after the finish is once applied. Have you any suggestions as to how to overcome this condition?

A.—A method used to produce a brush chromium finish is as follows:

After copper plating the brushed effect is put on the work by using a greaseless composition on a rag wheel. A good wheel is made by using 10 or 12 inch sections of stitched buffs (one inch sewings) fastened together with nails or rivets and washers. The greaseless composition is applied to the wheel and allowed to dry for a few seconds before using. After the brushing operation, nickel plate and brush again. Then chromium plate. A light brushing is sometimes necessary after chromium plating.

A satin finish is produced after copper plating by using a satin-finishing wheel, then nickel plating, satin finishing again, and chromium plating.

The satin-finishing wheels are made by using a Yale hub which contains a number of pins upon which tufts of wire are fastened, and which allows these tufts of wire to perform a swinging motion when placed upon the polishing or scratch-brushing lathe. The hub and wire tufts can be purchased from the plating supply houses. They are operated at a speed of 2800 R.P.M.

The greaseless composition can be purchased also from plating and polishing supply houses, and the wheels upon which this composition is used are operated at 1400 to 1800 R.P.M.

These finishes are not subject to staining or tarnishing, and do not have to be protected when chromium plated.

We are not familiar with a Butler chromium finish, but if you have a sample which you can send to us, we will give you the method used to produce this finish.

O. J. S., Problem 5,299.

Nickel and Copper Analysis

Q.—Under separate cover we are mailing you samples of our nickel and cyanide copper solution to be analyzed.

We find that the nickel plates hard and is a little hard to buff, but buffs off quickly on brass and copper base metals; i. e., on the high spots.

A.—Analysis of nickel solution:

Metallic nickel	2.28 oz.
Chlorides	2.06 oz.
pH	5.8

The metal content is a little low; otherwise, analysis shows that there is nothing wrong with the solution. We suggest that you add 2 oz. single nickel salts to each gallon of solution, and then check upon the current density used.

Analysis of cyanide copper solution:

Metallic copper	2.77 oz.
Free cyanide	0.33 oz.

The free cyanide content of the solution is too low. If the solution is operated at room temperature, add ¾ oz. sodium cyanide to each gallon of solution. If operated warm, add ½ oz. sodium cyanide to each gallon of solution.

O. J. S., Problem 5,300.

Nickel Analysis

Q.—Under separate cover we are sending you another sample of our nickel solution. We are also sending another sample shaft which was plated today, which plainly shows the trouble we are having with the nickel plating.

A.—Analysis of nickel solution:

Metallic nickel	2.13 oz.
Chlorides	1.85 oz.
pH	5.2

This solution is in a very poor condition for the class of work you are doing. As all constituents of the solution are too low, we suggest that you add 40 lbs. single nickel salts, 5 lbs. sodium chloride, and 18 fluid oz. 26° ammonia to the solution. To prevent the rough deposit, we suggest that you place the anodes in muslin bags. To prevent the pitting, add hydrogen peroxide to the solution until the pitting stops.

O. J. S., Problem 5,301.

Refinishing Silverware

Q.—We have been doing considerable plating of silverware such as knives and forks, teapots, sugar bowls, etc. We strip this work in a cyanide solution with reverse current. After the work is stripped a black scum appears which is almost as heavy as the scale on black iron. Can you tell us anything we can use to remove this? After stripping we give the work a coat of nickel before silver plating.

A.—In stripping silverware by using the cyanide strip with the reverse current, agitation of the work or the solution is essential to producing a satisfactory job. Agitation of the work is preferable. If the work is agitated and the cyanide content of the strip is high enough, good results should be obtained.

After the work is stripped, it should be pickled in strong muriatic acid, and then scratchbrushed wet before the polishing operation is performed.

If the work is made of soft metal, it should not be nickel plated, but a special silver strike solution should be used in place of the nickel plating. If the work is made of nickel silver use the mercury or blue dip in place of nickel plating. For formulae for the various solutions see 1932 "Platers' Guidebook."

O. J. S., Problem 5,302.

Spotting Out

Q.—Under separate cover we are submitting a sample lock plate and window lock cam, both of which show the same sort of spotting and discoloration. The lock plate is made of steel, brass plated, whereas the window lock cam is a solid brass casting.

We have used the same clear lacquer on all sorts of other finishes without any spotting or discoloration. The only spotting occurs on brass or brass plate. These parts have been cyanized, dipped or tumbled.

A.—The question of what causes spotting out is of considerable interest to the plater or finisher of brass plated work. There are two different types of spotting out, known as crystal and stain. Yours is the stain type, and is caused by different conditions.

The window lock cam is very porous, and the small pores have absorbed some of the cleaning chemicals which, after lacquering, come out and cause discoloration. A thorough rinsing in alternate hot and cold water, and a baking for 18 to 24 hours at 350° to 400°F., are the methods suggested to overcome this trouble.

With the lock plate the "spotting out" is due to another cause. If you will examine this work very closely with a powerful magnifying glass, you will notice that where the stain spots appear the brass deposit is blistered. These small blisters have retained some of the plating or cleaning chemicals, and after lacquering this stain appears. The remedy for this type of spotting out is to eliminate the blistering of the deposit, which may be due to a condition of the brass solution or to faulty cleaning of the work before plating.

O. J. S., Problem 5,303.

Correction

In Problem 5,294, "Silver Analysis," on page 175 of the May issue, the word **cyanide** should have been used in line 13 instead of the word **chloride.**—Ed.

Gold Analysis

Q.—We are sending you a sample of gold solution. We have been using this solution hot, with stainless steel for the anode. The deposits were satisfactory. We believe the gold is used up in this solution, but what we are trying to determine is what makes the solution so cloudy. Is this caused by the anode? We are enclosing a piece of steel we have been using. You will note how it is pitted. Is this caused by the hot solution, or would the same thing happen in a cold solution?

A.—Analysis of gold solution, per gallon:

Metallic gold	4 pennyweight
Free cyanide	0.11 oz.

The free cyanide content is too low, and this is probably the cause of the anode being pitted. The metal content is also lower than it should be. We suggest that you add 4 pennyweight of gold and ½ oz. sodium cyanide to each gallon of solution. The addition of the cyanide will clear the solution.

O. J. S., Problem 5,304.

Bronze Solution

Q.—Will you please give a formula for a bronze solution.

A.—Use the following formula for a bronze solution:

Sodium cyanide	5 oz.
Copper cyanide	4 oz.
Zinc cyanide	½ oz.
Carbonate soda	2 oz.
Rochelle Salts	2 oz.
Water	1 gallon

Operate solution at 85° to 90°F., using 1½ to 2 volts. Temperature plays an important part in controlling the color of the deposit, so the tank should be provided with a steam coil with which the temperature may be varied to produce the desired color.

O. J. S., Problem 5,305.

Brown on Brass

Q.—How can I get a "tobacco" color or light brown (chocolate) finish on brass?

A.—The following method can be used to produce a light brown finish on brass:

Two solutions are necessary: one, a sulfur solution made by using half an ounce of liquid sulfur to one gallon of water; the other, an acid solution made by dissolving two ounces of copper sulfate in one gallon of water.

The work must be thoroughly clean. It is dipped in the sulfur solution, and then, without rinsing, dipped in the acid solution. The work is then rinsed in cold water. The dipping procedure is repeated 4 or 5 times, after which the work is dried and scratch brushed, using a fine crimped-brass-wire wheel to even the finish.

The work should be lacquered to preserve the finish.

O. J. S., Problem 5,306.

Nickel Analyses

Q.—We are sending samples of two nickel solutions for analysis and recommendations.—M. F., Cleveland, O.

A.—Analyses of nickel solutions:

No. 1	
Metallic nickel	3.37 oz.
Chlorides	4.90 oz.
pH	5.8
No. 2.	
Metallic nickel	3.48 oz.
Chlorides	5.04 oz.
pH	6.2

The chloride contents of both solutions are quite high, unless these are barrel plating solutions and cadmium is used as a brightener. If you had given us some information about the solutions, we would be able to advise what corrections to make.

O. J. S., Problem 5,307.

Saltpetre Blue

Q.—When blueing polished iron by the molten saltpetre method can a black blue be obtained? I have been using this method, but can get only a light blue or gun metal. Is 900 degrees the best temperature?

A.—If you are doing large work a temperature of 900°F. is about right for the molten saltpetre method of producing a blue black finish upon iron or steel. If the work is small, 700°F. should be used.

To produce a deeper blue color, the work should be oiled by using paraffine oil and the excess of oil removed by tumbling in sawdust or wiping with dry cloth.

O. J. S., Problem 5,308.

Bright Aluminum

Q.—We are manufacturing rings for playground equipment, making the ring of aluminum bronze and then casting an aluminum hand grip on it, and then polished.

This aluminum grip is made of sheet aluminum with 4% copper and sometimes of scrap aluminum.

This aluminum turns dark in the weather after a short time. We are told that being cast on bronze will make it turn dark.

Can you tell us what metal will stay bright?

It needs to be fairly tough to stand the banging against the pipe.

A.—We suggest that you use a mixture of:

3—½ copper
4—½ nickel
2—½ silicon
89—½ aluminum

This alloy takes a bright permanent polish. It is used for steering wheel spiders, vacuum cleaner castings, and other work requiring a high lustre. The nickel is best introduced in this alloy by using a 20% nickel 80% aluminum alloy which is obtainable on the market.

All aluminum alloys will tarnish more or less when exposed to the elements, and turn dark. However, the above alloy stands up very good.

If your requirements are such that the metal should stay bright under all weather conditions, we suggest that you chrome plate your present castings. This will protect your castings and remain bright under weather conditions. The casting of the aluminum on bronze has no effect on the color. What happens is that the rain and dirt and smoke fall on the casting and oxidize it. Chrome plating will shed the dirt, etc., and remain bright.

W. J. R., Problem 5,309.

Bright Dipping Aluminum

Q.—We have several hundred slightly tarnished aluminum castings which we wish to brighten so as to make them look like new, just the same as when they come from the foundry. The foundry uses a solution in which the castings are dipped so that they come nice and clean.

We would like to know what this solution consists of and directions for its use.

A.—For rough castings the best way to clean up is with the sand-blast. However, you can use a 10% nitric acid dip. Let them stand in the solution for about 5 minutes. Rinse in cold water, then in hot water and dry by swinging the article strung on a wire, and then dry in sawdust of good quality.

If there is grease on the casting, another method is to clean in benzine and dip into a scalding hot potash solution, not too strong, until the surface is dull and white. Rinse in cold water and soak for five minutes in a 5% solution of hydrofluoric acid. Then rinse in cold water and dip into a mixture of equal parts of nitric and sulphuric acid. Then rinse in cold water, then in the cleanest hot water. Dirty water will leave stains on the surface. Dry in sawdust. Box wood or birch sawdust should be used if possible.—W. J. R., Problem 5,310.

Patents

A Review of Current United States Patents of Interest

Printed copies of patents can be obtained for 10 cents each from the Commissioner of Patents, Washington, D. C.

1,945,142. January 30, 1934. **Method for the Electrolytic Production of Embossing Foils of Gold or Other Metal or of Different Metals.** Julius Fichtmueller, Stapleton, N. Y.

1,945,260. January 30, 1934. **Composition of Matter and Process of Treating Molten Metals.** Alfred H. Davies, deceased, late of New York, N. Y., by Edith Vail Davies, executrix, New York, N. Y.

1,945,565. February 6, 1934. **Process of Producing Heavy Metal Beryllium Alloys.** Ernst Pokorny, Leipzig, and Kurt Schneider, Bitterfield, Germany.

1,945,584. February 6, 1934. **Protective Paint or Lacquer for Food Containers.** Alberto Williams, Buenos Aires, Argentina.

1,945,623. February 6, 1934. **Electrodeposition of Alkaline Earth Metal Compounds on Metal.** Emil Theisz, Budapest, Hungary.

1,945,679. February 6, 1934. **Corrosion Resistant Alloy.** Michael George Corson, Jackson Heights, N. Y.

1,945,737. February 6, 1934. **Heat Treatment of Aluminum-Magnesium Alloys.** Edgar H. Dix, Jr., Oakmont, Pa., and Louis W. Kempf, Cleveland, Ohio.

1,945,851. February 6, 1934. **Wire Coating Machine.** Orville F. Freeland, Muskegon, Mich.

1,945,908. February 6, 1934. **Silver Polishing Machine.** Donaciano Mascareno, Los Angeles, Calif.

1,946,069. February 6, 1934. **Magnesium Base Die Casting Alloys.** Leo B. Grant and Otis E. Grant, Midland, Mich.

1,946,147. February 6, 1934. **Coated Aluminum and Aluminum Alloy.** Helmer Bengston, Indianapolis, Ind.

1,946,148. February 6, 1934. **Method of Coating.** Martin Tosterud, Arnold, Pa.

1,946,150. February 6, 1934. **Coating of Aluminum.** Martin Tosterud, Arnold, Pa.

1,946,151. February 6, 1934. **Protecting Aluminum From Corrosion.** Junius D. Edwards, Oakmont, Pa.

1,946,152. February 6, 1934. **Protecting Aluminum From Corrosion.** Junius D. Edwards, Oakmont, Pa.

1,946,153. **Protecting Aluminum from Corrosion.** Junius D. Edwards, Oakmont, Pa.

1,946,231. February 6, 1934. **Process for the Manufacture of Alloys of Precious Metals Which Are Amenable to Heat Treatment.** Leopold Nowack, Pforzheim, Germany.

1,946,609. February 13, 1934. **Alloy.** Alvin P. Bixler, Duncannon, Pa.

1,946,647. February 13, 1934. **Process of Coating Copper with Cellulose Acetate Lacquer.** Ernest R. Taylor and Harry I. Davis, Rochester, N. Y.

1,947,065. February 13, 1934. **Bimetal Thermostat.** Howard Scott, Wilkinsburgh, Pa.

1,947,121. February 13, 1934. **Aluminum Base Alloys.** Walter Bonsack, Cleveland, Ohio.

1,947,180. February 13, 1934. **Tarnish Resisting Silver.** Blasius Bart, East Orange, N. J.

1,947,122. February 13, 1934. **Surface Treatment of Magnesium and Magnesium Base Alloys.** Edward C. Burdick and William H. Gross, Midland, Mich.

1947,981. February 20, 1934. **Plating Aluminum.** Johannes Fischer, Berlin-Charlottenburg, Germany.

1,948,145. February 20, 1934. **Art of Electroplating.** George L. Wallace, Leyden, Mass.

1,948,235. February 20, 1934. **Electrolytic Manufacture of Iron and Its Alloys.** Ernst Kelsen, Vienna, Austria.

1,948,316. February 20, 1934. **Process of Refining Copper.** James Walter Scott, Chicago, Ill.

1,948,653. February 27, 1934. **Semipermanent Molding Apparatus.** Howard Emery, Andrew Irvine, and Arthur T. Bateman, Detroit, Mich.

1,948,805. February 27, 1934. **Sand Mixer.** Herbert S. Simpson, Chicago, Ill.

1,948,843. February 27, 1934. **Lacquering Machine.** Charles D. Dallas, Chicago, Ill.

1,948,992. February 27, 1934. **Die-Casting Machine.** Louis H. Morin, New York, N. Y.

1,949,082. February 27, 1934. **Method of Obtaining Heavy-Metal Beryllium Alloys.** Ernst Pokorny, Leipzig, Germany.

1,949,090. February 27, 1934. **Method and Material for Coating and Cleaning Metal.** Robert R. Tanner, Highland Park, and Herman Johan Lodeesen, Detroit, Mich.

1,949,112. February 27, 1934. **Riveted Plated Aluminum Article.** Gustav Schreiber, Bitterfield, Germany.

1,949,131. February 27, 1934. **Rhodium Plating.** Thomas P. Shields, Newark, N. J.

1,949,205. February 27, 1934. **Means for Protecting Silver, Etc., from Tarnishing.** George E. Herring and Frank E. Dean, Chicago, Ill.

1,949,372. February 27, 1934. **Making Lead Alloy Castings.** Ernest Graf, Philadelphia, Pa.

1,949,916. March 6, 1934. **Soldering Flux.** Howard S. McQuaid, East Chicago, Ind.

1,949,623. March 6, 1934. **Method of Uniting Metals and Compound Metal Article.** Bert L. Quarnstrom, Grosse Pointe Park, Mich.

1,950,197. March 6, 1934. **Cast Aluminum Rotor Winding.** Cyril S. Taylor, New Kensington, Pa.

1,950,214. March 6, 1934. **Method of Soldering Metal Objects.** Kurt Bassler, Westend, Berlin, Germany.

1,950,828. March 13, 1934. **Induced Draft Unit for Spray Booths.** Wayne B. Thompson, Winchester, Mass.

1,950,864. March 13, 1934. **Die-Casting Machine. Raymond J. Schultz,** Madison, Wis.

1,950,967. March 13, 1934. **Preparation of Aluminum Alloys.** Walter Bonsack, Cleveland, Ohio.

1,951,008. March 13, 1934. **Abrasive Blast Cleaning Machine.** Percival H. Best, Bridgeport, Conn.

1,951,122. March 13, 1934. **Interlocked Solder Joint and Method of Making the Same.** Paul Balze, Leonia, N. J.

1,951,125. March 13, 1934. **Solder Flux Applying Device.** William H. Brooks, Oconomowoc, Wis.

1,950,525. March 13, 1934. **Machine for Rolling Core Solder.** Andrew F. Sternad, Chicago, Ill.

1,950,555. March 13, 1934. **Polishing Machine.** Joseph H. Hunter, Bloomfield Hills, Mich.

1,950,568. March 13, 1934. **Die Casting Machine.** Daniel Richards, Luddenden Foot, England.

1,950,612. March 13, 1934. **Art of Coating Metals with Lead.** Daniel D. Jackson, Brooklyn, N. Y.

1,950,689. March 13, 1934. **Method of and Apparatus for Electropickling Metal.** John S. Nachtman and Clinton G. Thomas, Warren, Ohio.

1,950,779. March 13, 1934. **Spray Gun with Locked Controls.** Svend Bramsen, Chicago, Ill.

1,951,304. March 13, 1934. **Method of Coloring Copper and Copper Alloys.** John R. Freeman, Jr., Cheshire, and Philip H. Kirby, West Cheshire, Conn.

1,951,441. March 20, 1934. **Soldering Apparatus.** Darrell D. Rock, Cicero, Ill.

1,951,860. March 20, 1934. **Method of Making Unions for Metal Tubing.** Irving Cowles, Detroit, Mich.

1,951,911. March 20, 1934. **Mold for Castings of Iron and Nonferrous Metals.** Max Heusser, Winterthur, Switzerland.

1,951,893. March 20, 1934. **Electrodeposition of Metal Alloys.** Julius Winkler, Jr., Pforzheim, Germany.

1,952,048. March 27, 1934. **Aluminum-Berylium Alloy.** Robert S. Archer, Milwaukee, Wis., and William L. Fink, Oakmont, Pa.

1,952,049. March 27, 1934. **Aluminum-Beryllium Alloy.** Robert S. Archer, Milwaukee, Wis., and William L. Fink, Oakmont, Pa.

Equipment

New and Useful Devices, Metals, Machinery and Supplies

Spray Booths

The DeVilbiss Company, Toledo, Ohio, manufacturers of spray-painting and finishing equipment, announce a series of direct exhaust type spray booths designed especially for the peculiar requirements encountered in the application of flock. These new booths permit the concentration of spraying operations in one location, prevent material from scattering throughout finishing room, and reclaim all sprayed flock not applied to articles coated.

Booths range in sizes from two to ten feet frontal width. All are equipped with standard DeVilbiss direct type exhaust fans. Removable cheese cloth screens at rear of booths collect the flock and prevent it from passing out the exhaust pipe. Two, three, four, five and six foot booths are leg type, made entirely of twenty-four gauge galvanized sheet panels, bolted together and set on a frame work of black angle iron. They are equipped with metal curtain on top and sides, and the required sprinkler openings. A covered opening in bottom allows easy removal of accumulated material. Eight and ten foot booths are floor type, and may be obtained with metal floor if desirable.

Because of the great variety of requirements among finishers who use flock, it is advisable that each installation be surveyed and engineered to the particular needs of the user, the company says. The booths, therefore, are built only to special order.

Slitting Equipment

Waterbury Farrel Foundry and Machine Company, Waterbury, Conn., announces a line of improved slitting equipment. This includes the No. 2 worm unit motor driven slitter; No. 4 gang slitter, with heavy take up winder and scrap winder; No. 1, 12" gang slitter with floor type winder; No. 21/2 20" gang slitter with bracker type winder. The machines are available in belt driven style as well.

The company states the advantages of these machines include:

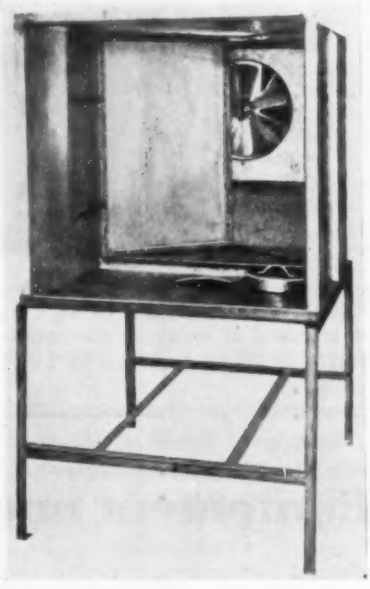
Reduced vibration and noise.

Reduced chances of scrap entering driving parts.

Absolute control by operator by jog or push button.

Reduced upkeep costs as compared with friction clutch or spur gear drive types.

The company has issued a bulletin on these machines.



New DeVilbiss Spray Booth

Fusible Alloy for Chucks

Special chucks are often required for holding irregularly shaped pieces during machining operations. The cost of the special chucks may be a large proportion of the total cost of machining, especially for small production jobs.

A low melting, non-shrinking alloy known as Cerro-Matrix or Matrix alloy is said to have given most excellent results for the production of inexpensive chucks and fixtures. Its low melting temperature permits it to be cast against pattern pieces of metal, wood, paper, rubber, bakelite or other molded plastics. The Matrix alloy castings are strong, yet soft enough to prevent marring of finished surfaces of the work. The non-shrinking property of alloy insures a perfect fit between the work and the chuck.

The alloy can be recovered from obsolete chucks and used repeatedly. The properties of Matrix alloy are:

Weight per cubic inch, 0.343 pounds; Tensile strength, 13,000 pounds per square inch; Brinell hardness, 19; Elongation, 1% in 2 inches; Freezing temperature, 248° F.; Pouring temperature, 300° to 250° F.

Matrix alloy is a product of the Cerro de Pasco Copper Corporation, 44 Wall Street, New York City.

Latest Products

Each month the new products or services announced by companies in the metal and finishing equipment, supply and allied lines will be given brief mention here. More extended notices may appear later on any or all of these. In the meantime, complete data can be obtained from the companies mentioned.

Plant Cleaning Equipment. Model D Hypressure Jenny provides means of cleaning floors, walls, machinery, etc., by hot water vapor spray. Machine weighs about 1,000 pounds, and is said to be designed for easy operation without specially trained help. Speed and efficiency are stressed in maker's announcement. Homestead Valve Manufacturing Company, Coraopolis, Pa.

Bench Lathe. Back-geared, screw cutting type; 9" swing; countershaft or motor drive; inexpensive. South Bend Lathe Works, South Bend, Ind.

Motors. New type with protection against overheating by means of the Lincoln Protector. Lincoln Electric Company, Cleveland, Ohio.

Scales. Dormant platform cabinet or unit weight type with 1 to 4 unit weights. Kron Company, Bridgeport, Conn.

Lead Coated Pipe. Standard and special lengths, thick or thin walled, in various metals, for installation in corrosion-resisting equipment; with uniform coating of antimonial lead applied by "leadhesion" process. Gross Engineering Corporation, 3955 W. 25th St., Cleveland, Ohio.

Electric Drill. Special ¼" type, with increased motor power and new streamline design. Black and Decker Manufacturing Company, Towson, Md.

Flanged Head Motors. New mountings for several of the company's line of motors. Applications include machinery such as lathes, polishers, pumps, etc. Louis Allis Company, Milwaukee, Wis.

Control Instrument. New indicating thermometer and pressure gauge controller. Brown Instrument Company, Philadelphia, Pa.

Portable Blower, Suction Cleaner. Five models for light and heavy industrial use. Provides source of large volume of dry air at low pressure, or suction. Skilsaw, Inc., 3310 Elston Avenue, Chicago, Ill.

Hose Joint. New type eliminates all contact between metal and fluid, gives perfect seal and great flexibility; for hose from 1½" diameter up. B. F. Goodrich Rubber Company, Akron, Ohio.

Sprayers, Rubbers, Sanders. Convertible stripers and flow guns described

in Bul. D3-34; airrubbing, polishing and sanding machines, Bul. G4-34; automatic aircoating and drying machine, Bul. C3-34. Paasche Airbrush Company, 1909 Diversey Parkway, Chicago, Ill.

New Nickel Aluminum Bronze

The Chase Brass and Copper Company of Waterbury, Conn., announces the development of a nickel-aluminum bronze composed of approximately 92 copper, 4 nickel, 4 aluminum. This bronze is said to possess extraordinary corrosion resistance and physical properties. It is recommended for the stringent requirements of power plants, marine work, oil refineries and the chemical industry. It can be supplied in the form of tubing, pipe, sheet, rod and some wire sizes. Some of the properties and advantages of this material listed by the manufacturers are as follows:

Freedom from dezincification, which makes it applicable to condenser and heat exchanger tube service.

Resistance to impingement attack, which results in air erosion or "end corrosion."

Resistance to corrosive waters, such as sea water.

Resistance to sulphur corrosion, prevalent in oil refineries.

Resistance to sulphuric acid of the strength used in pickling operations.

This nickel aluminum bronze, it is stated, has excellent cold working properties. Rods can be drawn to a tensile strength of about 100,000 pounds per square inch. It can be forged into a wide variety of shapes. Its hardness on the Rockwell F scale varies from 70 to 110 depending upon the temper. Its tensile strength ranges from 50,000 to 115,000 pounds per square inch, and as much as 150,000 pounds for very hard drawn wire.

Insulating Refractory

The Chicago Fire Brick Company, 1467 Elston Avenue, Chicago, Illinois, has developed a new plastic insulating refractory which is to be marketed under the trade name Pire. This insulating plastic is said to be particularly adaptable for use in intermittent furnaces where actual operating temperatures do not exceed 2500° F. The insulating properties reflect the heat, giving a flash heat to the walls in a much shorter period of time and thereby saving both fuel and labor due to the greatly shortened preheating period. Pire is not used to back up regular fire brick but is used in its place. It has the faculty, the manufacturers state, of being able to stand up under flame impingement, and because of its monolithic character heat loss by leakage is retarded; also that the material has practically no coefficient of expansion. It is light in weight, weighing approximately one-half of an ordinary fire brick after having been thoroughly burned in the furnace.

Bright Annealing Furnaces

Announcement is made of two complete lines of furnaces for bright annealing of nonferrous metals, and for silver soldering, by C. I. Hays, Inc., electric furnace manufacturers, Providence, R. I. The outstanding feature of these furnaces is said to be a new low standard of hydrogen consumption, made possible by design features adapted from the "Certain Curtain" method of sealing in the atmosphere, as used in their high speed steel furnaces. The two lines are described as Type LA for temperatures up to 1900°F and Type HA for temperatures between 1900°F and 2400°F. The former has metallic heating elements, while the latter is equipped with Globar Heating Elements. The furnaces illustrated herewith is Type LA, equipped with automatic conveyor mechanism. Hand operated styles are also supplied.

Hayes Annealing Furnace

Equipment and Supply Catalogs

Control Instruments. Esterline-Angus Company, Indianapolis, Ind. "Solving Industrial Crimes." Booklet. (132)

Industrial Cleaners. Canadian Permag Products, Ltd., Ottawa and Queen Streets, Montreal, Quebec. Series of leaflets on various industrial cleaners. (133)

Grinding Equipment. Norton Company, Worcester, Mass. Leaflets on a small, handy surface grinder (134); convenient tool room grinder (135).

Tube Couplings. Parker Appliance Company, 10320 Berea Road, Cleveland, Ohio. Bul. 35, illustrated 36-page catalog. (136)

Potentiometer Pyrometer. Brown Instrument Company, Wayne and Roberts Avenues, Philadelphia, Pa. Circular. (137)

Sheet Steel. Republic Steel Corporation, Youngstown, Ohio. Bul. 120, "Galvanealed" sheets for galvanizing. (138)

High Temperature Insulation. Johns-Manville, 22 East 40th Street, New York. Reprint of lecture on this subject used in schools. (139)

Dust Hazard Prevention. Northern Blower Company, West 65th Street and Barberton Avenue, Cleveland, Ohio. Series of folders presenting government reports and other authoritative data on the subject, to be issued monthly, to assist executives to eliminate this occupational sickness. (140)

Stair Treads. Norton Company, Worcester, Mass. Alundum rubber-bonded safety treads. Circular (141)

Sandblast Nozzle. American Foundry Equipment Company, Mishawaka, Ind., Circular. (142)

Save time. Use the coupon below to get any of the above catalogs or bulletins, or for data on any subject not mentioned this month. METAL INDUSTRY will see that you get them promptly.

METAL INDUSTRY
116 John Street, New York.

(Insert below the number in parentheses at end of each item desired.)

I wish to receive the following bulletins mentioned in June: .....

.....

I want information on the following equipment or materials also: .....

.....

Up-to-Date Generators

The development of new processes requiring heavy current for the deposition of metals, along with large production, in the various industries requiring such finishes on metal parts, has resulted in the demand by such users of generating equipment for the purposes mentioned, that manufacturers of electrolytic generators be prepared with new designs to meet the heavy duty requirements of modern practice. In the field of manufacturing low voltage, heavy current generators for electroplating, electrotyping, and general electrolytic work, is the Chas. J. Bogue Electric Co. of Hoboken, N. J.

The advent of the interpole in the construction of electroplating dynamos modernized this type of direct current generator, along with the standard types of direct current generators of higher voltage characteristics. Employing the interpole, improved commutation, resulting in smoother commutators, less wear, fewer brush replacements, and permitting a complete range of load from zero to maximum without an attendant making rocker arm adjustments to prevent heavy sparking, as occurred in many of the old type designs.

In redesigning their line of electroplating generators several years ago, the Chas. J. Bogue Electric Company decided to use ball bearings. Added to these features, solid copper studs, and other connections of the external circuit were re-designed to reduce to a minimum, the heavy losses formerly sustained in the flimsy construction of brush studs, and contacts generally used at that time.

The Bogue Company have re-designed the apparatus into the most modern equipment possible, complete in every respect to stand up under heavy duty, continuous operation, requiring a minimum amount of attention and renewal parts.

The management of the company is still in the hands of an original official of the company. On the death of its founder, Charles J. Bogue, the company passed into the hands of its former treasurer, Charles B. Little.

With the increased and better facilities of a modern factory with railroad siding and wharf, the Charles J. Bogue Electric Company are expecting renewed prosperity and service to its long list of old customers and new sources where the products of this old established firm, may be used.

News of Associations and Societies

American Foundrymen's Association

The American Foundrymen's Association is making an intensive drive to stimulate attendance and participation in the International Foundry Congress, to be held at Convention Hall, Philadelphia, Pa., October 22 to 26, 1934. The A.F.A. annual convention and exposition will take place at the same time.

Foreign foundry associations in the following countries will be represented at the Congress: England, France, Germany, Belgium, Chechoslovakia, Italy, Australia. The American Society for Testing Materials will co-operate in a session on testing of cast metals.

The non-ferrous division is planning a second symposium on deoxidation and degasification of non-ferrous alloys, and will have, in addition, papers on porosity in leaded bronze bushings, physical properties of high nickel bronzes, and effects of elevated temperatures on certain aluminum alloys used in aircraft.

A second broadside on the Congress has just been issued to foundrymen and manufacturers in the United States and Canada. The first, issued in March elicited a great deal of interest, especially from prospective exhibitors. It is believed the 1934 Congress will be a "world's fair" for the industry. C. E. Hoyt is managing the arrangements. A.F.A. headquarters: 222 W. Adams Street, Chicago, Ill.

A.F.A. Exchange Paper

C. M. Saeger Jr., chief of the experimental foundry section, division of metallurgy, U. S. Bureau of Standards, will present the A.F.A. exchange paper at the annual meeting of the Institute of British Foundrymen, taking place in England this month. His subject will be: "Studies in Cast Red Brass for Establishment of a Basic Classification of Nonferrous Ingot Metals for Specification Purposes." It will apply particularly to findings on the 85-5-5-5 alloy.

A. E. S. New England Branches Hold Meetings

Annual banquets and educational sessions were held by branches of the American Electroplaters' Society at Hartford, Conn., and at Boston, Mass., last month.

The Connecticut branches, comprising those at Bridgeport, Waterbury and Hartford-Connecticut Valley, held a joint annual banquet and educational session May 19, at the Hotel Garde, Hartford.

Boston Branch

Boston Branch held its annual session and banquet May 26, at the Hotel Manger, Boston. The principal speaker at the session was Dr. William Blum of the United States Bureau of Standards, whose subject was The Protective Value of Plated Coatings on Steel.

Harry C. Bernard, sales manager of the Magnuson Products Corporation, read a paper on "Recent Advances in Cleaning Methods."

Donald Wood, chemist, Reed and Barton, Inc., read a paper on "Buying from the Job Plater."

George B. Hogaboom, research head of Hanson-Van Winkle-Munning Company, Matawan, N. J., read a paper on "What Is Under the Plate?"

About 125 people attended the session and banquet. The greatest credit for the splended success of the affair has been given to Eric Rhinelander, a representative of the Magnuson Products Corporation, Brooklyn, N. Y. Mr. Magnuson did a great deal of work on the arrangements, and the effects of his efforts were certainly noticeable.

Mr. Rhinelander has been appointed chairman of the Boston Branch and will make a special effort at the coming convention of the American Electroplaters' Society at Detroit to get the Society to hold the 1935 convention at Boston.

Electroplaters' League

At the meeting of the United Electroplaters' League held on May 8th a very interesting address was delivered by H. C. Bernard on metal cleaning, after which he was kept busy answering questions that arose during a very lively discussion. C. H. Proctor, an honorary member of the League, took an active part in the discussion. Mr. Proctor bade the members farewell as he was about to start on a trip around the world.

At the previous meeting, April 24th, the members were instructed in basic technical knowledge of plating. This course will be continued all summer, and will take in methods of chemical control, analysis of solutions, etc.

Nickel Code Approved

National Recovery Administration approved a code of fair competition for the nickel and nickel alloy industry, effective June 3. The industry, consisting of three companies, normally employs 1,500 persons and at present employs 1,200.

The code provides for an administrative body of seven persons, six of whom are to represent the Nickel Alloys Association, Inc., and the seventh any member of the industry not member of the association.

Electrochemical Society

At the recent annual meeting held at Asheville, N. C., the following new officers of the Electrochemical Society were elected:

Dr. Hiram S. Lukens, University of Pennsylvania, Philadelphia, Pa., president; R. L. Baldwin, Niagara Falls, N. Y., Alexander Lowy, Pittsburgh, Pa., G. W. Heise, Cleveland, Ohio, and James H. Critchett, New York City, vice-presidents; L. R. Westbrook, Cleveland, Ohio, Sherlock Swann, Jr., Urbana, Ill., and J. J. Mulligan, East Chicago,

Ind., managers; Robert M. Burns, 463 West Street, New York City, treasurer; Colin G. Fink, Columbia University, New York City, secretary.

American Zinc Institute

Ralph M. Roosevelt, vice-president of the Eagle-Picher Lead Company, has been re-elected president of the American Zinc Institute. Other officers elected at the meeting held recently in St. Louis are: John A. Robinson, Commerce Mining & Royalty Company, vice-president; H. S. Wardner, New Jersey Zinc Company, vice-president; John O. Elton, International Smelting Company, vice-president; Howard I. Young American Zinc, Lead & Smelting Company, treasurer. Julian D. Conover was re-elected secretary.

Waste Material Dealers

The Waste Trade Committee provided for under the Code of Fair Competition for the Scrap Iron, Non-Ferrous Scrap Metals and Waste Materials Trade was organized at a meeting at Washington, D. C., May 15th.

George Birkenstein, Chairman of the Code Authority for the Non-Ferrous Scrap Metal Trade, was elected chairman, and Charles M. Haskins, secretary of four of the Code Authorities provided for in the Code, was elected executive secretary.

Secondary Metal Institute

The Western Division of the Secondary Metal Institute held a well-attended meeting at Chicago, May 14th. Louis Lippa, vice-president, presided, and various speakers discussed problems of the secondary metal trade.

Personals

Hugh Booth

When the Master Electro-Platers Institute of the United States met in January of this year, Hugh Booth was engaged as its executive secretary. He had previously been executive secretary of the Plating, Rust-Proofing and Enameling Association of Michigan, and before that had been N. R. A. counsellor in the Detroit office of the Department of Commerce.

Mr. Booth has had a varied and contrasting career during his forty years. Born in Yokohama, Japan, where his parents were missionaries, he got back to the United States sufficiently early to attend Blair Academy and the New Brunswick Theological Seminary, both in New Jersey; then he took an A. B. degree at Hamilton College, and went to Japan where he taught high school for two years. After that he was in the R. O. T. C., becoming a second lieutenant in 1917. After the war he attended the University of Michigan School of Business Administration for a summer. From 1926 to 1929 he studied law at the Detroit College of Law.

Mr. Booth began his industrial relations career in 1920 as factory representative in the personnel and cooperative department of the Studebaker Corporation, Detroit. He soon became office manager of the department, and was placed in full charge as manager in 1928. When Studebaker moved its manufacturing operations to South Bend in 1929, Mr. Booth joined the staff of the Detroit Y.M.C.A., as industrial secretary, where he remained until 1933. There he sponsored programs of discussion on human relations in industry for the benefit of Detroit industrial executives.

Regarding his present affiliation, Mr. Booth says he is "interested in helping the job plating industry to become the recognized and respected trustee and ally of the metal industries in respect to the protective, decorative and renovating processes on metal products and equipment." He favors no section or faction, but believes the Institute should serve all job platers, regardless of size, location or affiliations. He welcomes suggestions from master platers anywhere, respects their confidences, guards their secrets. He has a five word motto: "Cooperation in Competition through Confidence." His formula for eliminating suspicion or distrust is, "Go ahead and do the right thing yourself. Don't wait for the other fellow to do the fair thing first. He will follow when he sees you mean it. Few really enjoy the consequences of bad practices." Mr. Booth is convinced that no one can long compete against a policy of fair practices by using bad practices. Business based on outsmarting the competitor is a thing of the past, says Mr. Booth, and today is the day of the fair business man. He advises skeptics to try sincere fairness if they want a real thrill. Besides the thrill, he feels it will make for more security for everyone—employer, employee and customer—than a big profit statement ever did.

Mr. Booth has lived in Ferndale, a Detroit suburb, for the past 14 years. He is married, and has two daughters.

John F. Harman, who retired three years ago from chairmanship of Handy and Harman, New York, silver merchants, celebrated his 90th birthday last month. Mr. Harman, considered dean of the silver industry, had spent 64 years with his company when he retired. He had been associated with three generations of the Handy family in the firm bearing both names. He started under Parker Handy, who was succeeded by the late Parker Douglas Handy, who in turn was succeeded by Cortlandt W. Handy, now president of the company.

Edgar N. Dollin, formerly president of the Allied Die-Casting and Acme Die-Casting Corporations, has been appointed manager of the die-casting division of American Type Founders Corporation, Jersey City, N. J. The ATF die casting division will be expanded to take in all forms of commercial die casting. Mr. Dollin, who once was also general manager of the Precision Casting Company, is well known in the die casting industry, with which he has been actively connected since 1912.

Charles H. Proctor, well known to the electroplating industry, left New York on May 31 for a trip around the world on the Dollar liner Van Beuren. With him went Mrs. Proctor, his son Harry H., and a granddaughter, Jean. They will return about the end of September.

Oscar A. Lenna, head of Jamestown Metal Equipment Company, Jamestown, N. Y., has been elected president of Blackstone Manufacturing Company, Jamestown, manufacturer of washing machines.

Dr. Bruce W. Gonser has been appointed to the technical staff of Battelle Memorial Institute, Columbus, Ohio. Dr. Gonser graduated from Purdue in chemical engineering, received his Master's degree from the University of Utah, and his Doctor's degree in metallurgy from Harvard. His wide experience in nonferrous metallurgy particularly fits him for work on the Institute's recently announced research program sponsored by the International Tin Research and Development Council of London, England. (see page 221).

N. W. Pickering, president, Farrel-Birmingham Company, Ansonia, Conn., has been elected to the Code Authority of the Machinery and Allied Products Institute, representing the country's leading machinery builders.

Obituaries

Adolphe S. Deutsch

Adolphe S. Deutsch, veteran Cleveland, Ohio, metal manufacturer and president of the Monarch Aluminum Ware Company there, died at Rochester, N. Y., recently. Years ago he founded A. S. Deutsch and Company, Cleveland, to manufacture metal products. The firm was succeeded by Monarch Brass Company, then it became Republic Brass Company, and finally Monarch Aluminum Ware Company. Mr. Deutsch was 81 years old.

Industrial and Financial News

Plan Aluminum Company to Compete with Mellon

An application for a $20,000,000 loan from the Public Works Administration has been filed by Standard Aluminum and Alloy Company of Chicago, Ill., Decatur, Ala., and Bauxite, Ark., a newly organized company said to be headed by a group of widely known men operating through a Chicago engineering service. The application proposes to use the money to set up aluminum producing works in connection with the Tennessee Valley power development. Using ore mined in Arkansas, it would use a great deal of the TVA power, put many people to work and provide the first active competition for the Aluminum Company of America, Pittsburgh, Pa., controlled by the Mellon family, and the country's only producer of virgin aluminum. The proposal includes a fabricating plant at Decatur, Ala.

It is reported that the company asking the loan plans to make use of a process for recovering aluminum which is controlled by R. J. Gaudy, consulting engineer, Chicago, Ill., and that it is claimed aluminum can be produced for marketing at half the present price of virgin aluminum. Initial output of 200 tons a day is mentioned.

The application for the loan is reported to be getting the serious consideration of the Public Works and Tennessee Valley authorities. It is said to be in the hands of a special board of experts which will report to the government.

Job Galvanizing and Metal Coating Codes Signed

Supplementary Code for the Job Galvanizing and Metal Coating Industries was signed May 16. A meeting was called for May 24 to select a code authority.

Metals in America's Cup Defender

The yacht Rainbow, built by an American syndicate to defend the America's Cup, has a bronze underbody. There is a great deal of metal elsewhere in the trim craft also. A duralumin mast is being used. There is a 67-ton lead keel. Most of the deck fittings and rigging hardware are of nonferrous metal. Aluminum chairs and kitchen ware are being used in the cabin.

Chase Co. to Sell Lighting Fixtures on Installments

Chase Brass and Copper Company, Inc., Waterbury, Conn., sales subsidiary of Chase Companies, Inc., has entered the lighting fixture business after a long survey of the field. An innovation will be sale of fixtures on an instalment plan under which Commercial Investment Trust, Inc., New York, will finance such transactions. There will be a large sales and showrooms in New York, and authorized dealers throughout the country, all of whom will offer the deferred payment plan to fixture buyers.

Magnus Chemical Eastern Sales Conference

The annual eastern sales conference of the Magnus Chemical Company, Garwood, N. J., was held at that city recently, with 35 field men in attendance. The industrial cleaners and chemicals as well as the household products sales staffs for the eastern part of the country were represented at numerous functions held over a five-day period. Officers and executives of the company were also present. A midwestern conference similar to the one at Garwood was also held recently.

Program of Tin Research Begun in United States

Continuing its extensive research program in the principal tin using countries, the International Tin Research and Development Council has appointed the Battelle Memorial Institute, Columbus, Ohio, to conduct tin research projects for the United States. The Council includes the four leading tin producing countries, Malaya, Bolivia, Netherlands, East Indies and Nigeria. D. J. Macnaughton, the Council's director of research, recommended Battelle for the work here.

The chief industrial uses of tin in the United States are in connection with copper, lead and steel, in production of which this country leads the world. Projects of research in these uses, as well as in new uses, will be undertaken, the work having started already at Battelle. Tin is also used considerably in the form of chemical compounds.

New York office of the International Tin Research and Development Council is at 149 Broadway.

DuPont Sued for Taxes

United States Government last month filed suit against E. I. du Pont de Nemours and Company, Wilmington, Del., for $6,688,947, claimed as taxes on alcohol sold by the R. & H. Chemical Company, which du Pont acquired some time ago. Du Pont had no hand in the matter originally, and is sued only because it now owns R. & H. The tax is alleged to have been evaded through an arrangement R. & H. is said to have had with a firm producing denatured alcohol for use in lacquer thinner. R. & H., it is charged, received the lacquer thinner, but resold it for recovery of the ethyl alcohol therein.

MAGNUS CHEMICAL COMPANY'S EASTERN SALES CONFERENCE GROUP

Law on Posting of Labor Provision of Codes

Fabricated Metal Products Federation, 729 15th Street, N. W., Washington, D. C., has issued the following bulletin:

Attention of all manufacturers is directed to President Roosevelt's Executive order of February 8, 1934, and General Johnson's regulations of February 12, 1934, to the effect that all manufacturers must post in their plants official copies of labor provisionss of all NRA codes under which they operate. To quote the exact language of NRA—"A separate application must be made to the Code Authority established under each Code to which you are subject, on or before May 15, 1934, or within 45 days from the effective date of the Code, or the date upon which you become subject thereto, whichever is latest. Applications must state the number of official copies needed in order to carry out the requirement that official copies shall be posted conspicuously and in sufficient number to make them freely and conveniently accessible to all employees .... Furthermore, if you have made application for official copies of the labor provisions of a Code and thereafter engage in operations subject to the same Code in any additional shop, establishment, or separate unit, you must make a supplemental application within ten days of so doing. If you operate a number of establishments under a single Code, you need make only one application, but should estimate the number of posters needed for all establishments."

National Code Authorities are mailing government application forms to the manufacturers on which they are to apply for such posters directly to the Code Authorities under which they operate. The Administration desires to reach all known manufacturers, and since there is a penalty involved for failure to comply with posting regulations, manufacturers who have not received such forms should obtain them without delay. Plants operating wholly or in part under the Basic Code of the Fabricated Metal Products Manufacturing and Metal Finishing and Metal Coating Industry, you should apply to that Code Authority, 729 15th Street, N. W., Washington, D. C. Where other codes are involved, the appropriate Code Authority should be addressed.

Aluminum violins and other stringed instruments are being manufactured. Sheet is used for front and back, die castings for the sides or "scrolls". The instruments are reported to have been found satisfactory by musicians.

Business Items---Verified

Art Metal Company, New York, reelected officers at the annual meeting recently. Principal officers: H. K. Smith, president; A. J. E. Larson, vice-president and general manager; H. T. Swanson, secretary-treasurer.

I. A. Barnett Company, Barberton, Ohio, is remelting zinc, and expects to be melting other grades of white metals before long, according to **I. A. Barnett,** president.

Reynolds Metals Company has erected a new plant in Louisville, Ky., for production of aluminum bronze powder for paint. "Increased demand for this powder," says **Richard S. Reynolds,** president, "made this expansion necessary. With the new plant in Louisville, which includes the most modern equipment, our aluminum bronze powder production is now stepped up by 100 per cent."

Berkeley-Mattson Corporation, Box 383, Pontiac, Mich., has acquired factory property on Jackson Street, Pontiac, and will move there from former location in Detroit. Company makes mechanical and automotive equipment, operating too, stamping, lacquering and japanning departments.

Canadian Permag Products, Ltd., Montreal, Canada, manufacturers of industrial cleaning compounds report that their plant, established in April 1933, has just completed a very satisfactory year, and that business is improving.

The factory office of **The United States Stoneware Company,** which has been in Akron, Ohio, for the past sixty-nine years, has been moved to Tallmadge, Ohio, where a new two-story administration building has just been completed. Tallmadge is a suburb of Akron.

Premier Bronze Powder Company's plant at Painesville, Ohio, was destroyed by fire May 24. Damage was $100,000. Company pulverizes cast aluminum. Plans for rebuilding have not been announced. H. J. Doerr is general superintendent; George F. Glass, president.

New Incorporations

Central Casting, Inc., 102 South Third Street, Allentown, Pa.; nonferrous foundry, specializing in water tank heaters, hardware, plumbing goods; by Leo and Joseph Zellinger. Operates also polishing, grinding and japanning departments.

Southern Chemical Corporation has been formed with Delaware charter by American Cyanamid Company and Pittsburgh Plate Glass Company to produce chemicals at Corpus Christi, Texas.

Lub-O-Meter, Inc., 2447 South Michigan Avenue, Chicago, Ill.; manufacture testing equipment for crank case oil and new oil; by C. D. Masters, C. S. Healy and associates.

Battelle Institute Heads Under New Arrangement

Trustees of Battelle Memorial Institute, Columbus, Ohio, have appointed Clyde E. Williams director of the Institute, and Dr. H. W. Gillett chief technical adviser. A greater range of research and development work within the Institute has been planned and, in addition, many new projects of outside sponsorship recently have been accepted.

Both Mr. Gillett and Mr. Williams have been associated with the Institute since 1929, Dr. Gillett as director, sharing the administrative duties of the directorship with Mr. Williams as associate director, and at the same time serving as metallurgical supervisor of the Institute.

Dr. Gillett will now devote his entire time to scientific work where his outstanding ability will be utilized to the fullest extent on the Institute's own and sponsored projects. He will be at the head of a group of engineers.

American Brass Installs Rolling Mill at Fair

The American Brass Company, Waterbury, Conn., has installed a full size brass rolling mill in the Ford Exposition Building at the Century of Progress Exposition in Chicago. The mill, which weighs ten tons has a daily capacity in excess of 25,000 pounds of sheet brass. It will be in actual operation at the exhibit.

Metal Developments

Gold in quantities sufficient to pave North America exists in the sea, according to Dow Chemical Company men who recently discussed before the American Chemical Society their company's plant for bromine extraction from seawater. They also said there were in the sea vast quantities of silver, iodine, lead, copper, lithium, rubidium, nickel, cobalt, iron, manganese, sodium, zinc, caesium, magnesium, radium, tin and other elements. It is all so finely dispersed as to be impossible of economic exploitation now, they said, but they predicted that perhaps within 25 years the gold resources of the sea would be tapped.

Copper strip is used as a protective element in construction of a new type of concrete road. The strips are in form of an expansion joint. About 2500 pounds of copper per road mile is used.

Corporation Earnings

Net Incomes for first quarter of 1934, compared with first quarter of 1933. **Net Profit** is given unless preceded by (L) which means **Net Loss**

	1934	1933
Anaconda Wire & Cable Co., New York	$ 146,440	(L)$384,580
New Jersey Zinc Company, New York	1,092,207	437,378
International Nickel Company of Canada, Ltd	5,049,275	(L) 80,158
Revere Copper and Brass, Inc., New York	417,015	(L) 408,490

News From Metal Industry Correspondents

New England States

Waterbury, Connecticut

June 1, 1934.

Seventy-five men from the ranks of **Chase Company** employees met with executives of this concern and of the **Kennecott Copper Corporation** at a dinner at the Hotel Commodore in New York, May 15, in honor of the launching of the new line of Chase electric lighting fixtures, now being displayed at the new Chase Tower Building, 10 East 40th Street, New York. The men were those engaged in the production of the new line. The top, or 48th floor, is devoted entirely to a display of the new lights. The 46th and 47th floors contain displays of specialty products. Offices of the company and affiliated companies are on the 44th and 45th floors. Speakers at the dinner included F. S. Chase, president; Rodney Chase, assistant secretary of the company; E. T. Stannard, president of the Kennecott company; H. H. Holdsworth, chairman of the Chase Workers' Council.

Chase has entered into a contract with the Commercial Investment Trust Inc., for financing sales of the new line of lighting fixtures whereby authorized dealers may sell them on small down payments.

A charge made by representatives of some of the local unions that the **Waterbury Manufacturing Company,** a branch of the Chase companies, had been needlessly hiring workmen from out of town was investigated by William M. Harris local relief director, and found untrue. The concern has been hiring only buffers from out of town because there is an actual shortage of these workers here. The recent development of new and larger lines of novelties by Chase, **Scovill Manufacturing Company** and others has required the services of more buffers than at any time for several years. Mr. Harris says the company is steadily increasing the number of persons on its payroll.

Plume and Atwood Manufacturing Company has purchased the machinery and business of the **American Ring Company,** whose plant is across the street from its own. The machinery will remain there, and Plume and Atwood will rent the Ring Company building and continue operations there, using the Ring Company's employees. The latter now number only about 50 as the concern has steadily reduced operations during recent years; only about two or three departments have been working. American ring Company was incorporated in 1852. Its present officers are: president, Thomas D. Thatcher, Washington, D. C.; secretary, Charles H. Skilton, Watertown, Conn.; treasurer and general manager, John M. Burrall. The officers of the Ring Company will no longer participate in the operation of the plant.

A strike of many of the workmen at the **Chase Brass and Copper Company** plant in Cleveland, which lasted only a few days, was commented upon by the local offices of the concern as follows:

"As a result of the general labor unrest in Cleveland as shown by the troubles in the automobile body works, etc., a strike was called at our Cleveland plant by a radical organization not affiliated with any recognized union. There have been recent advances in pay there, and the rates there and in the Waterbury plants are materially higher than those called for the brass and brass products codes."

Representatives of the union calling the strike, the Steel and Metal Workers Industrial Union, announced they would come to Waterbury to organize the workers here but did not do so.

Representatives of the **American Federation of Labor** are gaining recruits here weekly for the skilled unions, such as machinists and toolmakers, and semi-skilled unions such as buffers and moulders, and are now beginning to organize the unskilled brass workers.

Waterbury Farrel Foundry Company is now more active than at any time in four years. It is receiving many orders for new machinery from all sections of the country and in the last few weeks has increased its payroll by approximately 200 men. The orders are mainly the result of factories holding off replacing obsolete equipment during the depression.

The assets of the **Waterbury Tack Company** have been sold by the receiver, Edward S. Cornell, to the **Shelton Tack Company,** Shelton, Conn., for $5,000. The latter concern immediately sold the business to a new firm, the **Waterbury Tack Co., Inc.,** for $15,428 and 10 shares of stock in the new concern. The difference in prices is because the Shelton firm had paid many claims and made allowances to the stockholders of the old concern.

Judge Edwin C. Dickenson last month granted the request of the receiver of the **Beardsley and Wolcott Manufacturing Company,** James R. Sheldon, former president, to continue operations for another month. The extension is needed to complete the proposed reorganization of the company, and the securing of a loan from the RFC.

William M. Goss, vice-president of Scovill has been named a member of the copper code authority to represent the brass mills. He is also a member of the national code authority for the fabricated metal products manufacturing, metal finishing and metal coating industry. **L. R. Carley** of the Patent Button Company is chairman of the national code authority for the fibre and metal work clothing button manufacturing industry. **C. T. Manville** of the Shoe Hardware Company is a member of the national code of the slide fastener industry.

Clifford F. Hollister, vice-president of the American Brass Company, has been elected a director of the state Chamber of Commerce.

The Bristol Company of this city has organized a subsidiary to be known as the **Bristol Company of Canada,** and its Canadian and British business will be handled by a plant of the latter concern in Toronto which has been conducted as an experimental laboratory for the past four years.

Ingersol-Waterbury Company, subsidiary of the **Waterbury Clock Company,** has brought out a sportswear watch for women and girls in special packaging.

W. R. B.

Connecticut Notes

June 1, 1934.

HARTFORD—The 1,300 workers of **Arrow-Hart and Hegeman Company** who went out on strike in April, have returned to work pending negotiations for a general 20% raise in pay. The company denies that a general 10% raise was granted, although it says certain employees received adjustments in pay amounting to 10%.

As a result of mediation by the National Labor Board, strikes of workers of the **Underwood Elliott Fisher Company** and of **Remington-Rand,** which have plants here have been settled.

Royal Typewriter Company's net earnings for the first quarter amounted to $283,059. In the first quarter of last year the earnings were $99,401.

Veeder-Root, Inc., directors declared a quarterly dividend of 40 cents a share payable June 1, the same as the previous dividend.

The new import duties on typewriters imposed by Great Britain will have no immediate effect on the **Royal Typewriter Company's** factory here, E. C. Faustman, president, says.

Colt's Patent Fire Arms Manufacturing Company directors declared the regular quarterly dividend of 25 cents a share, payable June 30.

NEW BRITAIN—A strike at the plant of **Landers, Frary and Clark** was averted last month by an agreement between the officials and a shop committee chosen by the workers. The men sought raises for time and piece workers amounting to 20% which was not granted. Adjustments were made raising the wages somewhat, however.

Landers, Frary and Clark are confining sales of the newly added line of electric refrigerators to New England and New York as demand from this

territory will absorb the entire output as scheduled.

Although there has been a steady layoff weekly of men from FERA projects, most of them have been absorbed by the local factories.

Stanley Works is building up a sizeable business in its line of "Stanlo," a master building toy by adding "Stanlite," a toy electric lighting unit by which any boy can wire and light any of the models he builds from Stanlo.

BRISTOL—E. Ingraham Company has let a contract to the Torrington Building Company for erection of two large additions to its plant on North Main Street. Local labor will be used wherever possible. The cost will be $100,000. Expectation of increased business in clocks and watches is the reason for the additions.

New Departure Manufacturing Company was represented last month at the exposition of the American Mining Congress in Cincinnati.

BRIDGEPORT — Bridgeport Brass Company is having plans prepared for a factory addition, 130 by 54 feet and one story high.

Remington Arms Company will acquire the assets and business of **Peters Cartridge Company** of Cincinnati, whose stock has always been closely held by three families.

MERIDEN — International Silver Company and subsidiaries report net earnings of $56,794 for the quarter ending March 31, compared with net loss of $362,319 for the same period last year. A new silverware design, known as the Trousseau pattern, has been put on the market.

MIDDLETOWN—More than 1,500 workmen of the **Remington-Noiseless Typewriter Company** went on strike last month but went back after a settlement was effected by the National Labor Board.

BERLIN—More than 200 strikers of the **Prentice Manufacturing Company,** makers of slide fasteners and buckles, went on strike last month, demanding a 20% increase in pay. The strike was adjusted by the state labor commissioner.

Providence, R. I.

June 1, 1934

Horace M. Peck, secretary of the Manufacturing Jeweler's Board of Trade, has been appointed permanent receiver for **Weiner & Woolf, Inc.,** manufacturing jewelers, 99 Stewart Street, Providence, on petition of **R. A. Kirshembaum,** secretary of the corporation. Mr. Peck has been authorized to continue the business.

Johnson Tool Company, Inc., East Providence, has been incorporated by Andrew E. Johnson, of East Providence; John C. Anderson and G. K. Crossley, of Providence.

Premier Ring Company, Inc., Providence, has been chartered to conduct a manufacturing jewelry business. Incorporators: Carmella Tortolina, Paul Marino and Agresses I. Bruno.

Upon petition of **Leonard Levin Company,** Horace M. Peck has been appointed receiver for **Star Jewelry Company, Inc.,** 101 Sabin Street.

Alfred Everett Sherman, head of the A. E. Sherman Machine Products Company, of which he was the founder some ten years ago, died suddenly at his home in Lincoln, R. I., following a heart attack on May 10. He was in his 74th year.

Providence Board of Contracts and Supplies has awarded contract for 40,000 pounds pig lead to **Phillips Lead & Supply Company,** at price of $4.25 a hundredweight.

Erving T. Arnold and Harry A. Tuell of Providence and W. Vincent Sumpter of Warren have incorporated an engraving business under the name of **United Engravers, Inc.**

Frederick A. Ballou, Jr., of the D. A. Ballou and Company, Inc., Providence, was re-elected president of the **Metal Finding Manufacturers' Association** at the annual meeting held May 2 at Narragansett Hotel, Providence. There was a large attendance.

It was voted to reduce the annual dues for the ensuing year from $12 to $10. The application of **Charles B. Donle and Sons,** Providence, for membership was approved. **William G. Lind** of T. W. Lind Company, presided at the election, the secretary being instructed to cast one ballot for the list of candidates presented by the nominating committee, there being no opposition. The following were elected besides President Ballou: vice-president, **Joseph P. Whitaker** of Whitaker-Fielding Company; secretary, **Edgar E. Baker** of William R. Cobb Company; treasurer, **William Whytock** of Roland and Whytock.

W. H. M.

Middle Atlantic States

Trenton, New Jersey

June 1, 1934.

More than 4,000 employees of the **John A. Roebling's Sons Company** have been granted pay increases, according to William A. Anderson, vice-president and treasurer.

General Cable Corporation, Perth Amboy, has received a large order for supplying copper wire and cables to be used in the electrification of the Pennsylvania Railroad between New York and Washington. The company is now adding more employees to its rolls.

The Raritan Copper Works, Perth Amboy, has benefitted by a contract received by the **Anaconda Wire and Cable Company,** which controls the New Jersey concern. Refined copper will be turned out by the Raritan company to be used at the Anaconda factories.

Copper Products Company, Bayview, N. J., and the **John A. Roebling's Sons Company** have also received large orders for copper wire.

Alvin S. Neumann, 33 years old, of 250 Cuyler Avenue, Trenton, N. J., sales manager of the Crescent Insulated Wire and Cable Company, Trenton, was killed May 13th in an automobile accident near Trenton.

C. A. L.

Newark, New Jersey

June 1, 1934.

Utility Tubing Company has leased a two-story factory building at 153 Frelinghuysen Avenue. The tubing company for several years has been located at Irvington.

Equity receivers for the **Lionel Corporation,** which has toy train factories in Irvington and Hillside, have been appointed by Federal Court. **Mandel Frankel** of New York, secretary of the concern, and **Worcester Bouck** of Montclair, N. J., were named receivers. A joint bond of $100,000 was set. The receivership was asked by an official of the company. Assets of the company are set at $795,000 and liabilities at $292,000, exclusive of stock. The company is said to be short of cash.

C. A. L.

Middle Western States

Detroit, Michigan

June 1, 1934.

Production in most of the major plants in Detroit and out-of-state industrial areas have shown signs of slowing up during the last two or three weeks. This is particularly noticeable in the metal plants. Weekly reports indicate the yearly peak in Michigan's greatest industry, automobiles, has been reached. Already experts are considering ways and means of leveling off production so that drastic declines may be avoided. Just as soon as motor car production shows a downward trend, caution becomes pronounced and purchasing agents instantly hesitate to release new contracts for materials. Industry in this area apparently is at its summer turning point. Every one is anxious and wondering about the future. Employment is holding about stationary, but prospects apparently are for an early decline.

Labor troubles have been hanging fire for the last week, but compromises have been reached that promise permanent adjustment at an early date.

Accessory plants are still in good production. Foundries also are active. Plating plants generally are busy. The early spring rust, however, is not continuing, and it is apparent that the sum-

mer will show the characteristics of other years.

Manufacture of plumbers' and steamfitters' supplies is not active. Most of the plants engaged in this work are concentrating on automobile supples. Manufacturing jewelers are doing little, a condition that has prevailed for a long time.

Appointment of **Robert T. Schenck** as chief metallurgist for the **Buick Motor Car Company,** Flint, Mich., has been announced.

Leonard Refrigerator Company announces an order for 2,345 electric refrigerators, the largest ever received from a single distributor. Thirty-nine freight cars were required to carry the record shipment from Detroit to Philadelphia.

Wohlert Corporation, Lansing, manufacturer of automobile parts, has purchased property adjacent to its plant for future expansion purposes, it is announced. The company's cylinder head department is working three crews on a 24-hour daily schedule, while all other employees are on full time.

Barkeley-Mattson Corporation, parts and specialty manufacturer, has transferred operations to Pontiac, it is announced. It will begin production shortly in a plant on Jackson Street, formerly occupied by an automobile specialties concern.

Renown Stove Company, Owosso, Mich., has increased production to the highest point since 1925, its biggest year according to announcement. It employs about 130 men.

Norge Corporation continues to be the largest single employer of labor in Muskegon Heights, Mich., and at the same time is 185 carloads, or 10,000 electric refrigerators, behind in orders, according to **H. Morley,** plant manager. Even at this figure he estimates that the peak production for his plant is not yet in sight.

Production at the plant of the **Eureka Vacuum Cleaner Company,** Detroit, is behind orders, with employment at the highest level since 1930, according to **Fred Wardell,** president. The upturn in vacuum cleaner sales, which began last September, has continued at an accelerated pace since that time, he says.

In order to increase its production volume, **Bates Ludington Company,** Ludington, Mich., has placed a second shift at work and expects to have the third engaged in a short time, it is stated. The plant is now producing 240 cylinder heads daily.

High tribute was paid to the memory of the late **Frederick B. Stevens** at the close of the 194th reunion of Scottish Rite Masons in the Valley of Detroit, at the Masonic Temple on Friday night, April 27. Before 50 members of the class named in his honor, Masonic leaders spoke of the sterling qualities of Mr. Stevens, who attained the highest honors Scottish Rite Masonry in North America could bestow. F. J. H.

Chicago, Illinois

June 1, 1934.

Although business in the Chicago district is still in general well above that of the same period last year, and compares more than favorably with many other sections of the country, there are indications that the usual summer slump has begun. Activity in tools and dies continues to be fair, with an expectation that Chicago manufacturers will gradually take over an increasing number of orders from Detroit automobile manufacturers who threaten to place orders outside the Detroit district in order to prevent tie-ups through possible future strikes.

Silas H. Altorfer, 50, president of the **A. B. C. Washing Machine Co.,** Peoria, died May 14 after a short illness.

Sales of Lycoming marine engines both in units and in dollar value for the first four months of this year exceeded those for all of 1933, according to **Z. H. Whiteman,** sales manager, **Lycoming Manufacturing Company.**

George L. See, supervisor of accounts for the **Western Electric Company,** has been elected president of the Illinois Manufacturers Costs Association.

Limited operation of the **Grigsby-Grunow Company** in order that it may service its products, chiefly radios and refrigerators, has been authorized by the referee in bankruptcy at the request of Frank McKay, receiver. Operation authorized under the order is limited to production of parts, and is designed to protect the $850,000 in accounts receivable from the bankrupt company's distributors. The sale of the property of the company has again been continued.

McGraw Electric Company directors were all reelected at the recent annual meeting.

British Empire export business of the **Coleman Lamp and Stove Company,** which has been handled from Chicago, has been transferred to Toronto because of Canada's more favorable position with England and its colonies through preferential tariff. No change in the general personnel in the plants is contemplated, however. Export business with South America, Mexico, and other points outside British control will continue to be handled through Chicago and the Pacific Coast, according to **G. M. Tilford,** vice president.

R. G. K.

Pacific States

California

June 1, 1934.

National Battery Company, Los Angeles, has reduced working hours from 40 to 36 a week, advanced wages 11%, and set up a bonus system for laborers.

Aircraft manufacturers on the West Coast are busy. Many are increasing their staffs.

The Magnussen Silver Shop has been opened at 3874 West 6th Street, Los Angeles, by Mr. Magnussen, formerly a silversmith with the Gorham Company, Providence, R. I.

Pacific Metals Industries, Pasadena, has been organized by **H. H. Murrin** and associates.

Firestone Tire and Rubber Company is building an addition to its battery plant at Los Angeles, at cost of $25,000.

Weber Show Case Company, 5700 Avalon Blvd., Los Angeles, is manufacturing store fixtures, fountains, beer dispensers, refrigerating equipment, etc.

Electro Draft Company, 315 West 9th Street, Los Angeles, has gone heavily into manufacture of beer containers, dispensers, etc.

Commercial Refrigerator Manufacturing Company, 1020 East 59th Street, Los Angeles, is making a new ice cream freezer.

Industrial X-Ray Corporation, 661 Chamber of Commerce Building, Los Angeles, is a branch of company with same name at Chicago, which manufactures "Metalix" X-ray apparatus developed by a Dutch concern.

California Metal Enameling Company, 2151 East 51st Street, Los Angeles, is producing about 500,000 enameled signs a year. Company has a large sheet metal department.

Smoot, Holman Company, Inglewood, is making enameled reflectors.

Joslyn Manufacturing Company, 5100 District Boulevard, Los Angeles, is producing hardware in good volume. Company makes a specialty of galvanizing.

Western Washer and Manufacturing Company, 2000 East Vernon Avenue, Los Angeles, is producing in volume all kinds of washers. Company operates complete plating, tinning and sherardizing departments.

Kinney Iron Works, 2525 East 49th Street, Los Angeles, is now making meehanite metal castings.

Other Pacific States

American Machine and Welding Works has moved to a new building at 1017 Broadway, Seattle, Wash. P. A. Briggs is manager.

Steel Built House Company, Portland, Ore., plans to construct all-metal prefabricated houses.

Master Oil Burner Company, Seattle, Wash., is putting up two buildings to cost $50,000, for oil burner manufacture.

Alaska Copper Works, Seattle, Wash., is building large copper brew kettles for breweries.

National Tank and Manufacturing Company, Portland, Ore., is making large beer storage and fermentation tanks.

H. S.

Metal Market Review

May 29, 1934.

The metals were generally firm in price throughout the month, with the exception of lead and zinc.

Lead went down from the 4.10c. St. Louis level which had held for a long time. On May 17 the leading producers reduced the price to 4.00c., and on May 18 cut it again to 3.85c. St. Louis, where it remains at this date. Copper was unchanged. Zinc dropped 5 points from the 4.40c. St. Louis level on May 7, and has held at 4.35c. since then. Complete daily metal prices for May are given in the table below, and latest available quotations are on the next page.

The copper code as it now stands calls for daily price quotations on Blue Eagle copper, which is lake or electrolytic copper that is eligible for sale to the government under N. R. A. regulations. A Copper Code Authority has been set up, and daily prices are issued on Blue Eagle lake and electrolytic copper. So-called Non-Blue Eagle copper (which is no different whatever in composition) is being quoted in trade at lower levels than the Blue Eagle, but consumers are naturally chary as to the effect the use of this metal might have on saleability of their products. There has been no ruling on sale or use of casting copper derived from scrap.

Tin showed a declining tendency, Straits having opened the month above 54.50c., whereas today it is quoted around 53c. Research with a view to increasing tin consumption through development of its uses has been started in this country. (See page 221.)

Aluminum and nickel remain unchanged.

Platinum was reduced in price early in the month, the leading interest quoting $36 since May 2, and metal being generally obtainable at $35 or lower for cash.

The silver market, subject to so many economic, political and speculative factors, has remained firm, rising gradually throughout the month from below 42c. to well above 44c. It went over 45c. at times.

Gold was unchanged at $35.

Scrap metals were lower priced in nearly all classifications the past month.

Code Authority of the Ingot Brass and Bronze Industry reports that thirty-five companies made combined shipments and deliveries during April, 1934, of 5,223 net tons of ingot brass and bronze, as compared with 5,291 tons in March.

Non-Ferrous Ingot Metal Institute reports average prices per pound received by its membership on commercial grades of six principal mixtures of ingot brass during the twenty-eight day period ending May 18, as follows:

80-10-10 (1% Impurities)	10.270c.
78% Metal	8.000c.
81% Metal	8,251c.
83% Metal	8.503c.
85-5-5-5	8.757c.
No. 1 Yellow Brass	7.036c.

The Wrought Metal Market

May 29, 1934.

Copper, brass and bronze fabricated and semi-finished products prices did not change last month, there having been no change in the basic copper price. Manufacturers continue to quote the levels which became effective on April 12.

There was a reduction of ¼c. in lead sheet and pipe on May 18, following a decline in the virgin lead price. Discounts were increased on lead products which are quoted on basis of discounts from a base price. These include lead traps, bends and drum traps, combination lead and iron bends and ferrules.

Consumption of various wrought metal products continued in good volume last month. The automobile industry and allied lines remained busy, taking good quantities of materials. Some other lines were also using metal in fair volume, it was reported. Connecticut manufacturers using all kinds of nonferrous metal were still employing the largest numbers they have had in years.

There appears to be a general idea among manufacturers that there will be a slackening in operations before long. Just what its duration will be is difficult to determine. In the best of times, however, metal manufacturing operations ease off at this time of the year.

Developments of interest to metal fabricators and metal goods manufacturers continue to turn up. Last month the New Haven railroad gave the Goodyear-Zeppelin Corporation a $200,000 order for a streamlined duralumin train.

Westinghouse is participating in the order. No doubt numerous other concerns will also have a hand in supplying accessories of various kinds.

Daily Metal Prices for May, 1934

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	1	2	3	4	7	8	9	10	11	14	15	16	17
Copper c/lb. Duty 4 c/lb.													
Lake‡ (del. Conn. Producers' Prices)	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625
Electrolytic‡ (del. Conn. Producers' Prices)	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
Casting (f.o.b. ref.)	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
Zinc (f.o.b. East St. Louis) c/lb. Duty 1¼ c/lb.													
Prime Western (for brass special add 0.05)	4.40	4.40	4.40	4.40	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Tin (f.o.b. N. Y.) c/lb. Duty Free, Straits	54.60	54.65	54.00	53.90	54.00	54.10	54.25	54.10	54.00	53.00	53.00	53.125	53.65
Lead (f.o.b St. L.) c/lb. Duty 2½ c/lb.	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.00
Aluminum c/lb. Duty 4 c/lb.	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3 c/lb.													
Electrolytic 99.9%	35	35	35	35	35	35	35	35	35	35	35	35	35
Antimony (Ch.99%) c/lb. Duty 2 c/lb.	8.20	8.50	8.70	8.70	8.70	8.70	8.70	8.70	8.60	8.60	8.60	8.50	8.50
Silver c/oz. Troy, Duty Free	41.75	42.625	42.75	42.75	43.50	43.75	45.125	44.25	44.25	44.625	44.50	44.00	44.875
Platinum $/oz. Troy, Duty Free	38.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Gold—Official Price[1] $/oz. Troy	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00

	18	21	22	23	24	25	28	29	30*	31	High	Low	Aver.
Copper c/lb. Duty 4 c/lb.													
Lake‡ (del. Conn. Producers' Prices)	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	...	8.625	8.625	8.625	8.625
Electrolytic‡ (del. Conn. Producers' Prices)	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	...	8.50	8.50	8.50	8.50
Casting (f.o.b. ref.)	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	...	8.25	8.25	8.25	8.25
Zinc (f.o.b. East St. Louis) c/lb. Duty 1¼ c/lb.													
Prime Western (for brass special add 0.05)	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.30	...	4.30	4.40	4.30	4.355
Tin (f.o.b. N. Y.) c/lb. Duty Free, Straits	53.15	53.125	53.30	52.75	52.80	53.00	53.15	53.125	...	52.65	54.65	52.65	53.519
Lead (f.o.b St. L.) c/lb. Duty 2½ c/lb.	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	...	3.85	4.10	3.85	3.993
Aluminum c/lb. Duty 4 c/lb.	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	...	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3 c/lb.													
Electrolytic 99.9%	35	35	35	35	35	35	35	35	...	35	35	35	35
Antimony (Ch.99%) c/lb. Duty 2 c/lb.	8.50	8.50	8.50	8.375	8.375	8.375	8.25	8.25	...	8.25	8.70	8.20	8.503
Silver c/oz. Troy, Duty Free	44.75	45.125	45.125	44.75	44.625	44.75	44.875	45.00	...	44.875	45.125	41.75	44.210
Platinum $/oz. Troy, Duty Free	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	...	35.00	38.00	35.00	35.136
Gold—Official Price[1] $/oz. Troy	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	...	35.00	35.00	35.00	35.00

‡ Blue Eagle copper. * Holiday.

Metal Prices, May 31, 1934

(Import duties and taxes under U. S. Tariff Act of 1930, and Revenue Act of 1932)

NEW METALS

Copper: Lake, 8.625, Electrolytic, 8.50, Casting, 8.25.
Zinc: Prime Western, 4.30. Brass Special, 4.40.
Tin: Straits, 52.65. Pig, 99%, 51.75.
Lead: 3.85. **Aluminum,** 23.30. **Antimony,** 8.25.
Nickel: Ingot, 35. Shot, 36. Elec., 35. Pellets, 40.
Quicksilver: Flasks, 75 lbs., $75.50. **Bismuth,** $1.30.
Cadmium, 55. **Silver,** Troy oz., official price, N. Y., June 1, 44⅝. **Gold:** oz., Troy, Official U. S. Treasury price June 1, $35.00. **Scrap Gold,** 6½c. per pennyweight per karat, dealers' quotation, June 1. **Platinum,** oz. Troy, $35-$36.

Duties: Copper, 4c. lb.; zinc, 1¾c. lb.; tin, free; lead, 2½c. lb.; aluminum, 4c. lb.; antimony, 2c. lb.; nickel, 3c. lb.; quicksilver, 25c. lb.; bismuth, 7½%; cadmium, 15c. lb.; cobalt, free; silver, free; gold, free; platinum, free.

INGOT METALS AND ALLOYS

	Cents lb.	U. S. Import Duty	Tax*
Brass Ingots, Yellow	7 to 8	None	4c. lb.[1]
Brass Ingots, Red	8¼to11	do	do
Bronze Ingots	9¼to12½	do	do
Aluminum Casting Alloys	15½to22	4c. lb.	None
Manganese Bronze Castings	20 to34	45% a. v.	3c. lb.[2]
Manganese Bronze Forgings	26 to38	do	do
Manganese Bronze Ingots	8¾to13	do	4c. lb.[1]
Manganese Copper, 30%	11½to16	25% a. v.	3c. lb.[2]
Monel Metal Shot or Block	28	do	None
Phosphor Bronze Ingots	9 to12	None	4c. lb.[1]
Phosphor Copper, guaranteed 15%	12¼to15	3c. lb.[2]	do
Phosphor Copper, guaranteed 10%	11¼to14	do	do
Phosphor Tin, no guarantee	61to75	None	None
Silicon Copper, 10%	18 to30	45% a. v.	4c. lb.[1]
Iridium Platinum, 5%	$37-38.50	None	None
Iridium Platinum, 10%	38-39.50	None	None

*Duty is under U. S. Tariff Act of 1930; tax under Section 60 (7) of Revenue Act of 1932.
[1]On copper content. [2]On total weight. "a. v." means ad valorem.

OLD METALS

Dealers' buying prices, wholesale quantities:

	Cents lb.	Duty	U. S. Import Tax
Heavy copper and wire, mixed	6⅛to 6⅜	Free	4c. per pound on copper content.
Light copper	5¼to 5½	Free	
Heavy yellow brass	3⅛to 3¾	Free	
Light brass	3 to 3¼	Free	
No. 1 composition	4⅞to 5⅛	Free	
Composition turnings	4⅝to 4⅞	Free	
Heavy soft lead	3 to 3¼	2⅛c.lb.	None.
Old zinc	2⅜to 2⅝	1½c.lb.	
New zinc clips	3 to 3¼	1½c. lb.	
Aluminum clips (new, soft)	12½to13½	4c. lb.	
Scrap aluminum, cast	10 to11	4c. lb.	
Aluminum borings—turnings	5½to 6	4c. lb.	
No. 1 pewter	32 to34	Free	
Electrotype or stereotype	27⅛to3	2⅛c. lb.*	
Nickel anodes	30 to33	10%	
Nickel clips, new	31 to33	10%	
Monel scrap	10 to19½	10% a.v.	

*On lead content.

Wrought Metals and Alloys

The following are net BASE PRICES per pound, to which must be added extras for size, shape, quantity, packing, etc., or discounts, as shown in manufacturers' price lists, effective since April 12, 1934. Basic quantities on most rolled or drawn brass and bronze items below are from 2,000 to 5,000 pounds; on nickel silver, from 1,000 to 2,000 pounds.

COPPER MATERIAL

	Net base per lb.	Duty*
Sheet, hot rolled	15.50c.	2½c. lb.
Bare wire, soft, less than carloads	12.75c.	25% a. v.
Seamless tubing	16.75c.	7c. lb.

*Each of the above subject to import tax of 4c. lb. in addition to duty, under Revenue Act of 1932.

NICKEL SILVER

Net base prices per lb. (Duty 30% ad valorem.)

Sheet Metal		Wire and Rod	
10% Quality	23.50c.	10% Quality	26.37½c.
15% Quality	25.62½c.	15% Quality	30.75c.
18% Quality	26.87½c.	18% Quality	34.00c.

BRASS AND BRONZE MATERIAL

	Yellow Brass	Red Brass 80%	Comm'l. Bronze	Duty	
Sheet	14¼c.	15⅛c.	15¾	4c. lb.	U. S. Import Tax
Wire	14¾c.	15⅝c.	16¼	25%	
Rod	12¾c.	15⅝c.	16⅛	4c. lb.	4c. lb. on copper content
Angles, channels	22¼c.	23⅜c.	23¼	12c. lb.	
Seamless tubing	16¾c.	17½c.	18⅜	8c. lb.	
Open seam tubing	22¼c.	23⅜c.	23¾	20% a. v	No tax.

TOBIN BRONZE AND MUNTZ METAL

(Duty 4c. lb.; import tax 4c. lb. on copper content.)

Net base prices per pound.	
Tobin Bronze Rod	16¼c.
Muntz or Yellow Rectangular and other sheathing	17⅜c.
Muntz or Yellow Metal Rod	13¾c.

ALUMINUM SHEET AND COIL

(Duty 7c. per lb.)

Aluminum sheet, 18 ga., base, ton lots, per lb. 32.80
Aluminum coils, 24 ga., base price, tons lots, per lb.....30.50

ROLLED NICKEL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Net Base Prices

Cold Drawn Rods	50c.	Cold Rolled Sheet	60c.
Hot Rolled Rods	45c.	Full Finished Sheet	52c.

MONEL METAL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

SILVER SHEET

Rolled sterling silver (June 1) 47.00c. per Troy oz. upward according to quantity. (Duty, 65% ad valorem.)

ZINC AND LEAD SHEET

	Cents per lb. Net Base	Duty
Zinc sheet, carload lots, standard sizes and gauges, at mill, less 7 per cent discount	9.50	2c. lb.
Zinc sheet, 1200 lb. lots (jobbers' price)	10.25	2c. lb.
Zinc sheet, 100 lb. lots (jobbers' price)	14.25	2c. lb.
Full Lead Sheet (base price)	7.75	2⅜c. lb.
Cut Lead Sheet (base price)	8.00	2⅜c. lb.

BLOCK TIN, PEWTER AND BRITANNIA SHEET

(Duty free)

This list applies to either block tin or No. 1 Britannia Metal Sheet, No. 23 B. & S. Gauge, 18 inches wide or less; prices are all f. o. b. mill:

500 lbs. or over .....15c. above N. Y. pig tin price
100 to 500 lbs. .....17c. above N. Y. pig tin price
Up to 100 lbs. .....25c. above N. Y. pig tin price

Lighter gauges command "extras" over the above prices.

Supply Prices on page 228

Supply Prices, May 31, 1934

ANODES

Prices, except silver, are per lb. f.o.b., shipping point, based on purchases of 500 lbs. or more, and subject to changes due to fluctuating metal markets.

Copper: Cast ..... 16c. per lb.
Electrolytic, full size, 13½c.; cut to size 13½c. per lb.
Rolled oval, straight, 13¾c.; curved, 14¾c. per lb.
Brass: Cast ..... 14¾c. per lb.
Zinc: Cast ..... 9c. per lb.

Nickel: 90-92% ..... 44c. per lb.
95-97% ..... 45c. per lb.
99%+cast, 47c.; rolled, depolarized, 48c.
Silver: Rolled silver anodes .999 fine were quoted June 1, from 48.00c. per Troy ounce upward, depending upon quantity.

WHITE SPANISH FELT POLISHING WHEELS

Diameter	Thickness	Under 50 lbs.	50 to 100 lbs.	Over 100 lbs.
10-12-14 & 16	1" to 2"	$2.95/lb.	$2.65/lb.	$2.45/lb.
10-12-14 & 16	2 to 3½	2.85	2.55	2.35
6-8 & over 16	1 to 2	3.05	2.75	2.55
6-8 & over 16	2 to 3½	3.00	2.70	2.45
6 to 24	Under ½	4.25	3.95	3.75
6 to 24	½ to 1	3.95	3.65	3.45
6 to 24	Over 3½	3.35	3.05	2.85

Any Quantity

4 to 6	Under ½, $5.00	½-1, $4.85	1 to 3, $4.75
1½ to 4	" 5.55	" 5.40	" 5.35
1 to ½	" 5.85	" 5.70	" 5.60

Extras: 25c per lb. on wheels, 1 to 6 in. diam., over 3 in. thick.
On grey Mexican wheels deduct 10c. per lb. from above prices.

COTTON BUFFS

Full disc open buffs, per 100 sections when purchased in lots of 100 or less were quoted April 2:

14" 20 ply 84/92 Unbleached	$57.30-70.96
11" 20 ply 84/92 Unbleached	39.15-48.48
14" 20 ply 80/92 Unbleached	45.95-56.90
11" 20 ply 80/92 Unbleached	31.50-39.01
14" 20 ply 64/68 Unbleached	42.45-52.57
11" 20 ply 64/68 Unbleached	29.14-36.09
Sewed Pieced Buffs, per lb., bleached	40c. to 1.09

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.10-12½
Acid—Boric (Boracic) granular, 99½+% ton lots	lb.	.04½-.05
Chromic, 75 to 400 lb. drums		.15-.15¼
Hydrochloric (Muriatic) Tech., 20 deg., carboys	lb.	.03
Hydrochloric, C. P., 20 deg., carboys	lb.	.06½
Hydrofluoric, 30%, bbls.	lb.	.07-.08
Nitric, 36 deg., carboys	lb.	.05-.06¼
Nitric, 42 deg., carboys	lb.	.07-.08
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl, drums	lb.	.09½-.11
Denatured, drums	gal.	.475-.476
Alum—Lump, barrels	lb.	.03¼-.04
Powdered, barrels	lb.	.03½-.05
Ammonia, aqua, com'l., 26 deg., drums, carboys	lb.	.02½-.05
Ammonium—Sulphate, tech., bbls.	lb.	.03½-.05
Sulphocyanide, technical crystals, kegs	lb.	.50-.58
Arsenic, white kegs	lb.	.04½-.05
Asphaltum, powder, kegs	lb.	.23-.41
Benzol, pure, drums	gal.	.41
Borax, granular, 99½+%, ton lots	lb.	.02¼-.02¾
Cadmium oxide, 50 to 1,000 lbs.	lb.	.55
Calcium Carbonate (Precipitated Chalk), U. S. P.	lb.	.05¾-.07½
Carbon Bisulphide, drums	lb.	.05½-.06
Chrome, Green, commercial, bbls.	lb.	.21½
Chromic Sulphate, drums	lb.	.33-.55
Copper—Acetate (Verdigris)	lb.	.21
Carbonate, 53/55% cu., bbls.	lb.	.15-.16½
Cyanide (100 lb. kgs.)	lb.	.38-.40
Sulphate, tech., crystals, bbls.	lb.	.0455
Cream of Tartar Crystals (Potassium Bitartrate)	lb.	.20¼-.20½
Crocus Martis (Iron Oxide) red, tech., kegs.,	lb.	.07
Dextrin, yellow, kegs	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	30.00
Fluorspar, bags	lb.	.03½
*Gold Chloride	oz.	$18¼-23
Gum—Sandarac, prime, bags	lb.	.50
Shellac, various grades and quantities	lb.	.21-.31
Iron Sulphate (Copperas), bbls.	lb.	.01½
Lead—Acetate (Sugar of Lead), bbls.	lb.	.10-.13½
Oxide (Litharge), bbls	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Methanol, (Wood Alcohol) 100% synth., drums	gal.	.42½
Nickel—Carbonate, dry, bbls.	lb.	.35-.41
Chloride, bbls.	lb.	.18-.22
Salts, single, 300 and 425 lb. bbls.	lb.	.12-.13
Salts, double, 425 lb. bbls.	lb.	.12-.13
Paraffin	lb.	.05-.06
Phosphorus—Duty free, according to quantity	lb.	.35-.40
Potash Caustic Electrolytic 88-92% broken, drums	lb.	.08-.093
Potassium—Bichromate, casks (crystals)	lb.	.08⅝
Carbonate, 96-98%	lb.	.08¾
Cyanide, 165 lbs. cases, 94-96%	lb.	.57½
Gold Cyanide	oz.	$15.45*
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge—Nickel, 100 lb. lots	lb.	.08
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in bbls.	lb.	.05-.07½
*Silver—Chloride, dry, 100 oz. lots	oz.	.38½
Cyanide, 100 oz. lots	oz.	.44-.50
Nitrate, 100 ounce lots	oz.	.33
Soda Ash, 58%, bbls.	lb.	.0252
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.16½-.22
Beryllium fluoride (2NaF. BeF_2)	lb.	4.30-7.00
Gold Cyanide	oz.	$17.10*
Hyposulphite, kegs, bbls.	lb.	.03½-.06½
Metasilicate, granular, bbls.	lb.	3.55-3.70
Nitrate, tech., bbls.	lb.	.02¼
Phosphate, tribasic, tech., bbls.	lb.	.03¾
Silicate (Water Glass), bbls.	lb.	.01½
Stannate, drums	lb.	.35-.40
Sulphocyanide, drums	lb.	.30-.45
Sulphur (Brimstone), bbls.	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.41
Tripoli, powdered	lb.	.03
Trisodium Phosphate—see Sodium Phosphate.		
Wax—Bees, white, ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½-.06
Zinc—Carbonate, bbls.	lb.	.11-.12
Chloride, drums, bbls.	lb.	.07½-.10
Cyanide (100 lb. kegs)	lb.	.38
Sulphate, bbls.	lb.	.033-.037

* Gold and silver products subject to fluctuations in metal prices.